

**CLASS 436, CHEMISTRY: ANALYTICAL AND IMMUNOLOGICAL TESTING****SECTION I - CLASS DEFINITION**

This is the generic class for:

A. Processes which involve a chemical reaction for determining qualitatively or quantitatively the presence of a chemical element, compound or complex in a composition or a chemical compound, or an element or radical in a compound.

B. Process for analysis which involve an in vitro antigen-antibody, immunological or protein binding interaction other than those involving a living antigen, or enzyme label.

C. Processes of analysis or study of the chemical properties of a sample; the physiological effect of a sample; or chemical determination of a physical property of a sample.

D. Compositions and their mere methods of use of thermoparticulating compositions.

E. Chemical test standards for A, B, and C.

F. Analytical compositions for A, B or C subject to the caveat in Lines With Other Classes, Other Search Notes, "A. Class 252 Compositions Search," below.

G. Combinations of tests or measurements with methods of regulating a chemical reaction not otherwise provided for in a chemical synthesis class or otherwise.

- (1) Note. For an elaboration of the distinction between subclasses 1-146 and subclasses 147-181 which provide for methods of examining the results of a significant chemical interaction see Lines With Other Classes, "Classification Guidelines For This Class," below.

**SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS****CLASSIFICATION GUIDELINES FOR THIS CLASS**

A. Compositions: Standards and Analytical Compositions used to prepare a sample for chemical testing or to standardize a test procedure are classifiable in subclasses 8-19. Subclasses 8-19 will also provide for the

process of use of such standards to calibrate a test procedure but will not provide for a comprehensive chemical test process including calibrating and analytical testing of an unknown. Compositions used for qualitative or quantitative chemical testing are classifiable with their process of use.

Class 516 provides for compositions otherwise seemingly proper for Class 436 when the compositions are subject matter relating to: colloid systems (such as sols\*, emulsions, dispersions, foams, aerosols, smokes, gels, or pastes) or wetting agents (such as leveling, penetrating, or spreading); subcombination compositions of colloid systems containing at least an agent specialized and designed for or peculiar to use in making or stabilizing colloid systems; compositions and subcombination compositions specialized and designed for or peculiar to use in breaking (resolving) or inhibiting colloid systems; processes of making the compositions or systems of the class; processes of breaking (resolving) or inhibiting colloid systems.

B. Testing Processes: Methods of chemical testing or analysis are classifiable on the basis of the specie tested for if such specie is claimed or solely disclosed. Subclasses 147 - 181 provide for processes not limited by claim or sole disclosure to the concepts of subclasses 1-146. If placement in subclasses 147 - 181 appears proper, two cautions should be observed. First, the claim or claims in question should be scrutinized for the presence of a significant chemical interaction which is not merely the application of measuring technique otherwise classifiable in another class. Second, due to long-standing conflicts and nonuniform practice in the determination of significant chemistry, classification in subclasses 147 - 181 indicates that at least a cursory search should be made of the class providing for the appropriate technique absent significant chemistry.

A method of testing for a disease or condition if by claim or disclosure is a test for a particular chemical specie and classification is proper in the subclass providing for that specie.

A test for an extract or factor is properly classifiable in the subclass providing for the major chemical constituents as determined by the disclosure or a standard reference work.

A process directed to the analysis of a complex is classified on the basis of the first appearing member of the complex.

A process testing a flue gas, off gas, combustible gas, or

other gaseous composition for a particular claimed or solely disclosed species should be classified with that species. A broad analysis claim should be classified in subclasses 147 - 181.

A broadly recited anion or cation test is classifiable in subclasses 147-181.

A test to determine the utility or suitability if a sample for some use or some generalized property (e.g., toxicity, etc.) is properly classifiable in subclasses 2+.

C. Presumptive Identity: In the absence of a clear showing to the contrary the following will control classification. Terms are followed by their Presumed Classification

Term: "acidic" or "basic" component Presumed classified as: inorganic acid or base

Term: ginseng extract Presumed classified as: saponin

Term: hydrocarbon Presumed classified as: compound of hydrogen and carbon only

Term: isotopes Presumed classified as: nonisotopic form

Term: marahuana Presumed classified as: tetrahydrocannabinol

Term: octane test Presumed classified as: hydrocarbon

Term: organo Presumed classified as: hydrocarbon derivative

Term: "organic compound" Presumed classified as: by technique in 147 - 183

#### GENERAL NOTE

The mere presence of a chemical reaction is not generally sufficient to place a patent in this class. This class provides for the qualitative and quantitative analysis of chemical compounds, complexes and elements which at some point involve a chemical interaction. In other words, the subject matter of this class involves an investigation of what chemical specie is present and/or how much of the specie is present or investigates some chemical property of a sample. The technique used to detect the result of chemical interaction need not be chemical but may involve a physical, optical or electrical measurement. No attempt should be made to apply or generalize the lines of any given class to any other

given class in regard to this class. In any instance where the line notes use the word significant or nominal this is especially true and the limits of such terms can only be determined on a case by case basis in view of an examination of the patents in the involved class. See References to Other Classes, below, for the lines between this class (436) and related classes.

#### OTHER SEARCH NOTES

##### A. Class 252 Compositions Search.

This class was created by incorporation of chemical standards and chemical testing compositions from Class 252, subclass 408.1. The superior subclasses in 252 other than subclass 1 were not screened to remove all chemical test compositions or standards properly classifiable therein. Thus, when considering the proper search and classification of a chemical testing composition Class 252 should always be consulted. Upon conclusion that 252 does not provide for the subject composition, the composition is properly classifiable in this class.

##### B. Class 424 in vivo/ in vitro line.

Class 436, subclasses 500+ incorporate patents to in vitro antigen-antibody, immunological, or protein binding tests formerly classified in Class 424, subclass 1.5 (which no longer exists) and subclasses 2+. Class 424 continues to provide for in vivo antigen-antibody, immunological, or protein binding tests when the final testing or diagnosis step occurs in or on the living body. A document which includes the in vivo production of an in vitro test material or reagent, such as the in vivo production or treatment of an antigen or antibody used in an immunoassay, will be provided for the Class 436 (see especially subclasses 543-548).

##### C. Analysis in combination with other chemical processes.

This class includes tests or measurements of any type claimed in association with a chemical reaction when the reaction is not part of a process elsewhere classifiable. Measurements and tests when claimed in association with e.g., condition responsive control, etc., chemical processes provided for in other classes, e.g., 208, 260, 435 etc., are classified in the class providing for the chemical process.

##### D. Immobilized peptides, namely proteins, enzymes and immunologically active species

Immobilized peptides, namely proteins, enzymes and immunologically active species are classified in Classes 260, 435 and 436 respectively. In the instance where the claims are directed to a generic immobilization process with or without species claims to the particular peptides the order of superiority of placement is 435, 436, and 260 (including the resin series). Class 424 will take a composition which may contain any of the immobilized species above as a composition for the treatment of the living body and will control placement.

#### E. Composition class superiority.

The rules for determining Class placement of the Original Reference (OR) for claimed chemical compositions are set forth in the Class Definition of Class 252 in the section **LINES WITH OTHER CLASSES AND WITHIN THIS CLASS**, subsection **COMPOSITION CLASS SUPERIORITY**, which includes a hierarchical **ORDER OF SUPERIORITY FOR COMPOSITION CLASSES**.

### SECTION III - REFERENCES TO OTHER CLASSES

#### SEE OR SEARCH CLASS:

- 71, Chemistry: Fertilizers, provides for a process of soil analysis combined with the application of Class 71 composition in response to the analysis.
- (a) 436, Chemistry: Analytical and Immunological Testing, provides for a process of qualitative or quantitative chemical analysis of a soil sample.
- 73, Measuring and Testing, is the generic class for making a measurement or test of any kind not provided for in other classes. Class 73 is also the generic class for sampling processes and apparatus not otherwise provided for (Class 73 provides in Note (3) of the Class Definition an extensive listing of classes for measuring and testing, per se, and a sampling).
- (a) 436, Chemistry: Analytical and Immunological Testing, provides for processes of analysis which involve a chemical reaction and a qualitative or quantitative measurement or test and such processes including sampling or sample preparation (For a more precise indication of the line between this class and Class 73 the line and search notes indexed in section IV should be consulted).

- 116, Signals and Indicators, provides for a signal or indicator wherein the signal or indicator is given by a chemical reaction, e.g., change in color, smoke, odor etc. Class 116 provides for a temperature indicator which has a single temperature indication.
- (a) 436, Chemistry: Analytical and Immunological Testing, provides for a method of qualitative or quantitative chemical analysis.
- 128, Surgery, provides for methods including the use of claimed specific structure adapted to be placed on or in the living body and further includes diagnostic or therapeutic methods and apparatus when the only disclosed utility is for diagnosis or treatment of a living body.
- (a) 436, Chemistry: Analytical and Immunological Testing, provides for methods of qualitative or quantitative chemical testing including (1) the in vitro testing of a body fluid which may be diagnostic of a body condition as well as (2) methods wherein the disclosed utility of a chemical test is both diagnostic and nondiagnostic.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, provides for processes of chemical manufacture not otherwise provided for and for a process of chemical testing when combined with such process. Class 156 particularly provides for a process of measuring and testing when combined with a process of etching or laminating.
- (a) 436, Chemistry: Analytical and Immunological Testing, provides for a process of qualitative or quantitative chemical analysis of a crystalline material, etching solution or laminate material.
- 162, Paper Making and Fiber Liberation, provides for a process of fiber liberation including a step of chemical testing of the fiber or testing fluid as well as providing for chemical testing in combination with a paper making operation.
- (a) 436, Chemistry: Analytical and Immunological Testing, provides for a qualitative or quantitative chemical test of fibers, paper or processing fluids therefor when not claimed in combination with a process of fiber liberation or paper making.
- 166, Wells, for a chemical test in combination with a process of using, making or treating a well where such process incorporates more than a nominal step in a claim reciting drilling or

- treating a well or recovering a fluid therefrom. The headnotes of Class 166 provide comprehensive listing of the disposition of well related testing art.
- (a) 436, Chemistry: Analytical and Immunological Testing, provides for processes of chemical analysis of samples derived from wells which may include a step of inserting and recovering an absorbent material or a nominal step of drilling or treating a well or recovering a fluid therefrom.
- 175, Boring or Penetrating the Earth, provides for a process for boring into the earth combined with a measurement or test where more than a mere step of boring is claimed.
- (a) 436, Chemistry: Analytical and Immunological Testing, provides for a process of chemical testing combined with a nominal step of earth boring.
- 210, Liquid Purification or Separation, provides for a process of chromatographic separation for separation of the constituents of mixture.
- (a) 436, Chemistry: Analytical and Immunological Testing, provides for a process including gas or liquid chromatography with a colorimetric test of the colored bands or bands from the chromatography column where a chemically reactive reagent is necessary to develop the color for the colorimetric test.
- 250, Radiant Energy, provides for a method of using, generating, controlling or detecting radiant energy or a subcombination thereof when not otherwise provided for. This includes use of X-rays to determine chemical composition or crystal structure as well as use of a mass spectrometer.
- (a) 436, Chemistry: Analytical and Immunological Testing, provides for a qualitative or quantitative chemical test including a step involving the generation, use or detection of radiant energy. The mere use of a fluorescent material is not considered to be chemical, at least in regard to Class 250.
- 252, Compositions, provides for a chemical testing composition when claimed in combination with a composition specifically provided for in Class 252 and for physical testing, analysis, indicating or warning agents or for physical standards, tracer or identification compositions.
- (a) 436, Chemistry: Analytical and Immunological Testing, provides for compositions used in a process of chemical analysis including tracers, identifying compositions, diluents, buffers, standards, compositions which simulate or calibrate a test as well as chemical reactants and immunochemical compositions for in vitro testing (See the note on creation of this class for a more complete analysis of the relation of compositions of this class with other classes).
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, provides for a step of chemically testing or inspecting some variable condition in a shaped article, molding material, mold or shaping surface as part of a process included in Class 264.
- (a) 436, Chemistry: Analytical and Immunological Testing, provides for a chemical test or analysis of a shaped article absent a claim to a process of producing the shaped article.
- 324, Electricity, Measuring and Testing, is the residual home for measuring and testing electrical properties or the measuring testing or sensing of nonelectric properties (e.g., moisture, pH etc.) by electric means including a chemical reaction by name only. The presence of any detail to the chemical reaction is beyond Class 324. In general, a 324 process may result in the identification of a chemical specie by NMR, ESR, conductivity, impedance, or other electrical property but only absent a significant chemical reaction in which case Class 436 will provide for the combination.
- (a) 436, Chemistry: Analytical and Immunological Testing, will provide for electrical measuring, testing or sensing when claimed in combination with significant chemical reaction. Significant is taken to mean the inclusion of any detail of a chemical reaction in the claimed process.
- 340, Communications: Electrical, provides for electrical indicating and measuring systems which include the use of a catalytic or semiconductor gas detector.
- (a) 436, Chemistry: Analytical and Immunological Testing, will provide for the use of a catalytic or semiconductor gas detector when claimed as part of a process involving a significant chemical

- reaction as part of a qualitative or quantitative chemical analysis.
- 356, Optics: Measuring and Testing, provides for methods and apparatus for determining the optical or nonoptical properties of materials or articles by noting the effect produced by the materials or articles or light associated therewith. Light analysis includes spectroscopy, interference, polarization, shade or color and photometers. The material properties involve crystal or gem examination, blood analysis, optical pyrometers, oil testing, document verification, refraction testing, light transmission or absorption, light reflection, and inspection for flaws or imperfections in materials.
- (a) 436, Chemistry: Analytical and Immunological Testing, will provide for a process of optical examination which involves a chemical reaction either prior to the optical examination or as a chemically reactive reagent or indicator necessary to develop color or produce an optically detectable result.
- 424, Drug, Bio-Affecting and Body Treating Compositions, provides for an in vivo test which may include a chemical reaction. Class 424 provides for: compositions (A) for preventing, alleviating, treating, or curing abnormal and pathological conditions of the living body, for maintaining, increasing, decreasing, limiting, or destroying a physiologic body function, for diagnosing a physiological condition or state by an in vivo test, for controlling or protecting an environment or living body by attracting, disabling, inhibiting, killing, modifying, repelling, or retarding an animal or micro-organism, (B) for deodorizing, protecting, adorning, or grooming a body, (C) for fermentates and extracts for use in A or B and not elsewhere provided for, and (D) such compositions defined in terms of specific structure; methods of making the above compositions; methods of using the class defined compositions for purposes in A and B; and methods of using compounds, per se, for purposes in A and B.
- (a) 436, Chemistry: Analytical and Immunological Testing, provides for in vitro qualitative or quantitative chemical analysis including the use of an in vitro antigen-antibody interaction as well as for production of an immunological test material by treatment of a live animal.
- 426, Food or Edible Material: Processes, Compositions, and Products, provides for processes of performing a test or measurement on an edible combined with an additional operation for treating, preparing, or perfecting an edible, with the exception of an additional operation which is solely involved in perfecting the test or measurement.
- (a) 436, Chemistry: Analytical and Immunological Testing, provides for processes of performing a test or measurement on an edible involving a chemical reaction.
- 435, Chemistry: Molecular Biology and Microbiology, provides for a test or measurement involving a microorganism or enzyme which functions catalytically as well as antigen antibody tests involving a living microorganism or enzyme label.
- (a) 436, Chemistry: Analytical and Immunological Testing, provides for a measurement or test in which an enzyme reacts chemically, i.e., noncatalytically and antigen-antibody tests for the identification of chemical species that do not involve a living antigen or enzyme.
- (1) Note. The burden of showing an enzyme is functioning noncatalytically is on Class 436, i.e., the presumption, as between Class 435 and Class 436, is that an enzyme in a testing composition functions catalytically until rebutted.
- 702, Data Processing: Measuring, Calibrating, or Testing, subclasses 22 through 32 for chemical analysis with significant data processing.

## SECTION IV - GLOSSARY

### ANTIBODY

A protein of the globulin in type that is formed in an animal organism in response to the administration of an antigen and that is capable of combining specifically with that antigen. Abbr Ab. See also immunoglobulin.

### ANTIGEN

A substance, frequently a protein that can stimulate an animal organism to produce antibodies and that can combine specifically with the antibodies thus produced; called also complete antigen as distinct from a hapten. Abbr Ag.

**ANTIGEN - ANTIBODY COMPLEX**

The generally insoluble molecular aggregate that is formed by the specific interaction of antigens and antibodies. It is also referred to as the immune complex.

**HAPTEN**

A substance that can react selectively with antibodies of the appropriate specificity but stimulates the production of these antibodies in an animal only when it is coupled to a carrier.

**IMMUNOADSORBENT**

An insoluble material that is used for the purification of antibodies by adsorbing them from a serum; a gel for trapping antibodies, or an inert solid to which either antigens or haptens have been covalently linked are two examples.

**IMMUNOASSAY**

An assay that utilizes antigen antibody reactions for the determination of chemical substances.

**IMMUNOELECTROPHORESIS**

A technique for identifying antigens in complex mixtures by first separating the antigens in one dimension by means of gel electrophoresis, and then allowing them to react with antibodies by means of two dimensional double diffusion through the gel; a pattern of precipitin arcs is thereby produced. Abbr IE.

**IMMUNOGLOBULIN**

1. A protein of animal origin that has a known antibody activity. 2. A protein that is closely related to an antibody by its chemical structure and by its antigenic specificity.

**SUBCLASSES****1 PROCESS OR COMPOSITION FOR STERILITY OR PACKAGE INTEGRITY TEST:**

This subclass is indented under the class definition. Processes or compositions for determining the effectiveness of a prior sterilization process or the physical integrity or a package by means of a chemical reaction.

- (1) Note. Processes classifiable in this subclass include monitoring the presence or absence of a sterilizing agent such as ethylene oxide.

**SEE OR SEARCH CLASS:**

- 435, Chemistry: Molecular Biology and Microbiology, subclass 11 for methods and materials for determining the effectiveness of a sterilization procedure which involves the use of an enzyme or microorganism.
- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, appropriate subclasses for subject matter relating to: colloid systems (such as sols\*, emulsions, dispersions, foams, aerosols, smokes, gels, or pastes) or wetting agents (such as leveling, penetrating, or spreading); subcombination compositions of colloid systems containing at least an agent specialized and designed for or peculiar to use in making or stabilizing colloid systems; compositions and subcombination compositions specialized and designed for or peculiar to use in breaking (resolving) or inhibiting colloid systems; processes of making the compositions or systems of the class; processes of breaking (resolving) or inhibiting colloid systems; in each instance, when generically claimed or there is no art class. Class 516 provides for compositions otherwise seemingly proper for Class 436 when the compositions are colloid systems or wetting agents.

**2****PROCESS OR COMPOSITION FOR DETERMINATION OF PHYSICAL STATE OR PROPERTY BY MEANS INCLUDING A CHEMICAL REACTION:**

This subclass is indented under the class definition. Processes or compositions for determining physical state or a physical property by means of a chemical reaction.

- (1) Note. Also included in this subclass are processes for determining the thickness

of a coated material by means of a chemical reaction.

- (2) Note. Processes for determining pressure by nonvolumetric techniques is included in this subclass, i.e., via flame ionization.

**SEE OR SEARCH CLASS:**

- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 64 for a process of surface bonding and/or assembly combined with a step of determining some chemical property of the product or a component thereof.
- 162, Paper Making and Fiber Liberation, subclass 49 for a chemical test of a property or characteristic of a fiber or treating fluid when combined with a process of fiber liberation and subclass 198 for a process of chemically determining some property in combination with a paper making operation.
- 264, Plastic and Nonmetallic Articles Shaping or Treating: Processes, subclasses 40.1+ for a process of Class 264 shaping or treating which includes a step of chemical treating which includes a step of chemical testing or inspecting of the product or shaping surface including a determination of completeness of reaction.
- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, appropriate subclasses for subject matter relating to: colloid systems (such as sols\*, emulsions, dispersions, foams, aerosols, smokes, gels, or pastes) or wetting agents (such as leveling, penetrating, or spreading); subcombination compositions of colloid systems containing at least an agent specialized and designed for or peculiar to use in making or stabilizing colloid systems; compositions and subcombination compositions specialized and designed for or peculiar to use in breaking (resolving) or inhibiting colloid systems; processes of making the compositions or systems of the class; processes of breaking (resolving) or

inhibiting colloid systems; in each instance, when generically claimed or there is no art class. Class 516 provides for compositions otherwise seemingly proper for Class 436 when the compositions are colloid systems or wetting agents.

**3**

**Leak detection:**

This subclass is indented under subclass 2. Processes or compositions for a test in which a chemical reaction is included in a process for detection of leaks.

- (1) Note. Included in this subclass are processes for determining leaks in a closed system, or, equipment failure wherein the material leaking out of the closed system, or a tracer leaking from the closed system, is determined by a chemical reaction, e.g., reaction with a colorimetric indicator. Examples of closed systems are refrigeration systems, heat exchangers, tanks, etc.

**SEE OR SEARCH CLASS:**

- 73, Measuring and Testing, subclasses 40+ for physical tests of leakage; 598 and 600 for flaw or discontinuity detection by use of a vibration.
- 252, Compositions, subclass 62.52 for a magnetic flaw detection composition.
- 374, Thermal Measuring and Testing, for thermal measuring and testing.

**4**

**Of crystal or crystalline material:**

This subclass is indented under subclass 2. Processes and compositions therefore in which a physical property of a crystal or crystalline material is determined by means involving a chemical reaction.

- (1) Note. This subclass includes gross determination of the crystallinity of a material e.g., polymer, etc., as well as a determination of the crystal habit of a compound by means of a chemical reaction.
- (2) Note. The loss or gain of a water of crystallization is considered to be a chemical reaction while other alternations of crystal structure are not.

**SEE OR SEARCH CLASS:**

- 29, Metal Working, subclass 25.35 for the electrical measuring testing or sensing of piezoelectric crystals combined with the manufacture thereof.
- 73, Measuring and Testing, Digest 4 for physical test of piezoelectric properties.
- 117, Single-Crystal, Oriented-Crystal, and Epitaxy Growth Processes; Non-Coating Apparatus Therefor, for processes of measuring, testing, or sensing in combination with single crystal growth.
- 125, Stone Working, subclass 12 and 13.01+ for apparatus and methods for cutting crystal which include the step of first examining optically and working the crystal for axis orientation.
- 324, Electricity: Measuring and Testing, subclass 109 for the electrical testing of a piezoelectric crystal.
- 356, Optics: Measuring and Testing, subclass 30 for a process of optical testing of crystals including gems, piezoelectric and semiconductor crystals which may include nominal cutting or etching of the crystal.
- 378, X-Ray or Gamma Ray Systems or Devices, appropriate subclasses, 44 through 50 for the use of X-rays to determine chemical composition or crystal structure or a process of X-ray crystallography.

**5 Surface area, porosity, imperfection, or alteration:**

This subclass is indented under subclass 2. Processes or compositions for chemically determining surface area of an object or part of an object; the permeability of a surface; the roughness of portions of a surface; or the alteration of a surface.

- (1) Note. This subclass provides for colorimetrically or fluorescently determining flaws, imperfections or surface defects of a metal surface or metal coating.

**SEE OR SEARCH CLASS:**

- 73, Measuring and Testing, subclasses 104+ for surface roughness testing.

**6****Corrosion resistance or power:**

This subclass is indented under subclass 2. Processes or compositions for chemically testing the corrosion resistance of material, the corrosiveness of a sample material, the presence or strength of a corrosion inhibitor, or determining corrosion preventing properties.

**SEE OR SEARCH CLASS:**

- 73, Measuring and Testing, various subclasses for methods of physical determination of corrosion particularly subclass 104.
- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclass 53 for apparatus for carrying out the process of this subclass.

**7****By thermoparticulating composition:**

This subclass is indented under subclass 2. Compositions for and processes in which a chemical composition decomposes at a desired temperature to indicate the temperature of some part of a device on which it has been coated and the decomposition products are detected chemically.

- (1) Note. This subclass will provide for a process use of a thermoparticulating agent even if claimed in combination with nominal electrical structure.

**8**

**COMPOSITIONS FOR STANDARDIZATION, CALIBRATION, SIMULATION, STABILIZATION, PREPARATION OR PRESERVATION: PROCESSES OF USE IN PREPARATION FOR CHEMICAL TESTING:**

This subclass is indented under the class definition. Compositions which are used to mimic or quantify the effect, in a chemical test procedure, of another chemical composition, or to stabilize, preserve or otherwise prepare a sample for a chemical test and the processes of use of such materials preparatory to a chemical test procedure.

- (1) Note. This and the indented subclasses resulted from the incorporation of Class 252, subclass 408.1, into this class. The user is cautioned that a claim to a composition provided for in Class 252 e.g., a



lubricant with a test agent, etc., will be provided for in Class 252 absent a claim to a test method.

- (2) Note. This and the indented subclasses provide for a test in which a substance which produces a standardized result is used in place of the actual specie to be tested for.
- (3) Note. This and the indented subclasses do not provide for original placement of a process which includes the test for the actual specie or species of interest.

**SEE OR SEARCH CLASS:**

- 252, Compositions, subclass 408.1 for physical test standards.
- 324, Electricity: Measuring and Testing, subclass 308 and 317 for the use of a control sample in nuclear resonance spectrometry and electron resonance spectrometry.
- 356, Optics: Measuring and Testing, various subclasses for use of standards in a process of optical testing particularly subclass 42, for optical blood standards; subclass 46, for light standards, per se; subclass 243, for optical standards generally; subclass 412, for colorimeters which utilize a solid or liquid transmissive standard; subclass 420, for a colored light source used as a standard and 421 for reflective light standards.
- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, appropriate subclasses for subject matter relating to: colloid systems (such as sols\*, emulsions, dispersions, foams, aerosols, smokes, gels, or pastes) or wetting agents (such as leveling, penetrating, or spreading); subcombination compositions of colloid systems containing at least an agent specialized and designed for or peculiar to use in making or stabilizing colloid systems; compositions and subcombination compositions specialized and designed for or peculiar to use in breaking (resolving) or inhibiting colloid systems; processes of making the

compositions or systems of the class; processes of breaking (resolving) or inhibiting colloid systems; in each instance, when generically claimed or there is no art class. Class 516 provides for compositions otherwise seemingly proper for Class 436 when the compositions are colloid systems or wetting agents.

**9**

**Simulative of a gaseous composition:**

This subclass is indented under subclass 8. Compositions and methods which produce the effect of a gas composition for the purpose of calibration or otherwise simulating a chemical effect of the gas simulated.

**SEE OR SEARCH CLASS:**

- 252, Compositions, subclass 372 for gaseous compositions, per se.

**10**

**Particle count or volume standard or control (e.g., platelet count standards, etc.):**

This subclass is indented under subclass 8. Compositions and methods in which a chemical composition is designed to simulate the number of particles in some fluid of interest or to have a desired volume related property.

**11**

**Blood gas standard or control:**

This subclass is indented under subclass 8. Compositions and processes which simulate the effect of blood in a test for blood gases.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 68, blood gas tests absent the presence or use of a standard or control.

**SEE OR SEARCH CLASS:**

- 73, Measuring and Testing, subclasses 61.65+ for testing the settling rate of liquid suspensions of solids.
- 356, Optics: Measuring and Testing, particularly subclasses 40+ for a transmissive or reflective optical measurement or test performed on blood such as statistical counting of blood component particles, determination of hemoglobin content or determination of oxyhemoglobin in blood.

- 359, Optics: Systems (Including Communication) and Elements, for the counting of blood cells or particles one by one.
- 377, Electrical Pulse Counters, Pulse Dividers, or Shift Registers: Circuits and Systems, subclasses 10+ for particulate counters with or without the sizing of the particles counted.
- 600, Surgery, for diagnostic methods which utilize light sensing units on or in the body for the testing or inspection of blood subclass 309 for a method wherein a physical characteristic of blood is measured by means placed against or in the body, e.g., time required for blood to clot, erythrocyte sedimentation rate, white cell count or viscosity.
- 12 Bilirubin or uric acid standard or control:**  
This subclass is indented under subclass 8. Compositions and processes which simulate the chemical effect of bilirubin or uric acid to calibrate or standardize a test.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
97, for tests for bilirubin absent the use of a standard or control.  
99, for tests for uric acid absent the use of a standard or control.
- 13 Lipid, cholesterol or triglyceride standard or control:**  
This subclass is indented under subclass 8. Compositions and processes which standardize or calibrate a test or test procedure for a lipid, cholesterol, or triglyceride.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
71, for a test for lipids, cholesterol or triglycerides.
- 14 Glucose, ketone, or nitrate standard or control:**  
This subclass is indented under subclass 8. Compositions and processes which simulate the chemical effect of a composition containing glucose, ketone or nitrates.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
95, for a test for glucose.  
110, for a test for nitrates.  
128, for a test for ketones or ketone bodies.
- 15 Protein or peptide standard or control (e.g., hemoglobin, etc.):**  
This subclass is indented under subclass 8. Compositions or processes which simulate the chemical effect of a protein or peptide.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
66, for a test for a hemoglobin.  
86+, for tests for proteins or peptides.
- 16 Blood serum or blood plasma standard or control:**  
This subclass is indented under subclass 8. Compositions or processes in which simulate the chemical effect of blood serum or plasma.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
63, 66, 67, 68, and 70, for tests involving blood or blood fractions.
- 17 Preparation composition (e.g., lysing or precipitation, etc.):**  
This subclass is indented under subclass 8. Compositions which are used to prepare a sample for a chemical test.
- (1) Note. Typically the compositions find use in either freeing the sample from material which would interfere with the test procedure by lysing or precipitation of the interfering material.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
175, for processes of digestion or removal of interfering materials as part of a chemical test.
- 18 Preservative, buffer, anticoagulant or diluent:**  
This subclass is indented under subclass 8. Compositions which are added to a sample for a chemical test which compositions serve to prevent deterioration of the sample, stabilize

the pH, prevent the sample from coagulating, or increase the volume of the sample.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

176, for a process of stabilizing or preserving a sample for a chemical test.

SEE OR SEARCH CLASS:

252, Compositions, subclass 380 for preserve compositions and especially subclass 398 for chemical change inhibitors.

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 113+ for compositions for or subcombination compositions for or breaking of or inhibiting of colloid systems (e.g., foam breaking, emulsion breaking, dispersion inhibiting, suspension settling, gel breaking, smoke suppressing, coagulating, flocculating), when generically claimed or there is no art class. See note (2) in subclass 113. Class 516 provides for compositions otherwise seemingly proper for Class 436 when the compositions are colloid systems or wetting agents.

## 19 Inorganic standards or controls:

This subclass is indented under subclass 8. Compositions or processes which simulate the chemical effect of an inorganic substance to standardize, or calibrate a chemical procedure.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

73+, for processes of chemical analysis of metals.

100+, for processes of chemical analysis of inorganic acids, or bases.

182, for processes of chemical analysis of inorganic compounds.

## 20 FOOD OR DAIRY PRODUCTS:

This subclass is indented under the class definition. Processes or composition therefor wherein constituents or components of food or dairy products are determined by a chemical reaction.

(1) Note. Food or dairy products tested under this subclass includes meat, fowl, fish or seafood, cereal or grain products, dairy products and beverages.

(2) Note. Foods tested are not limited to those defined by human consumption.

(3) Note. The constituents or components tested for include fats, oils, proteins, nitrates, metals, etc., so long as the claim is directed to the testing of some food or dairy product. A broader claim not limited to food would be classified below.

SEE OR SEARCH CLASS:

73, Measuring and Testing, appropriate subclasses, for measuring and testing of physical properties, especially subclass 169 for testing flour, dough or bread by physical means.

426, Food or Edible Material: Processes, Compositions, and Products, subclass 231 for processes of performing a test or measurement on an edible combined with an additional operation for testing, preparing, or perfecting an edible.

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, appropriate subclasses for subject matter relating to: colloid systems (such as sols\*, emulsions, dispersions, foams, aerosols, smokes, gels, or pastes) or wetting agents (such as leveling, penetrating, or spreading); subcombination compositions of colloid systems containing at least an agent specialized and designed for or peculiar to use in making or stabilizing colloid systems; compositions and subcombination compositions specialized and designed for or peculiar to use in breaking (resolving) or inhibiting colloid systems; processes of making the compositions or systems of the class; processes of breaking (resolving) or inhibiting colloid systems; in each instance, when generically claimed or there is no art class. Class 516 provides for compositions otherwise

seemingly proper for Class 436 when the compositions are colloid systems or wetting agents.

**21 Meat or eggs:**

This subclass is indented under subclass 20. Processes or compositions for testing of animal flesh or of eggs.

- (1) Note. Typically the processes of this subclass determine protein content.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 63, for a process of chemically testing a nonfood material derived from cellular material of a living body.  
86+, for processes and compositions for testing peptides, proteins, or amino acids not associated with a food.

**22 Dairy product:**

This subclass is indented under subclass 20. Processes or compositions wherein the products tested are derived from or include animal milk as a major constituent.

**23 Milk or butter fat:**

This subclass is indented under subclass 22. Processes or compositions for testing of milk or butter fat.

**24 Wine or alcoholic beverages:**

This subclass is indented under subclass 21. Processes or compositions wherein the food tested is an ethyl alcohol containing beverages.

- (1) Note. A dealcoholized beverage is presumed to contain at least a trace of alcohol and is classifiable in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 132, tests for ethanol not forming part of a food or beverage.

**25 GEOCHEMICAL, GEOLOGICAL, OR GEOTHERMAL EXPLORATION:**

This subclass is indented under the class definition. Processes or compositions utilizing chemical analysis for studying or determining the existence, location of flow of materials or studying other natural phenomena on, within or

below the earth's crust, or determining components of solids or ores.

- (1) Note. Most determinations are indirect for example determining metal carbonates,  $\text{HCO}_3$ ,  $\text{Ca}^+$ ,  $\text{Cl}^-$ ,  $\text{Mg}^+$ , as indication of deposits and will be classified according to purpose of the claim.

- (2) Note. The headnotes of Class 166, Wells, provide a comprehensive listing of well related testing art.

SEE OR SEARCH CLASS:

- 73, Measuring and Testing, subclasses 152.01+ for borehole testing, per se, wherein the test is not of a purely electrical type or of a purely magnetic type.  
166, Wells, subclass 264, 265+, 268, 336+, and 350+ for processes which may involve a chemical test when combined with more than a nominal step of well drilling treating or recovering a fluid therefrom. A process claiming the use of an injection and a separate recovery well is considered to be more than a nominal well treating step.  
324, Electricity: Measuring and Testing, subclass 323 for process of geophysical testing or investigation using electrical properties.  
435, Chemistry: Molecular Biology and Microbiology, subclass 9 for a process of testing for a mineral, oil, etc., by means of a microorganism or enzyme.  
516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, appropriate subclasses for subject matter relating to: colloid systems (such as sols\*, emulsions, dispersions, foams, aerosols, smokes, gels, or pastes) or wetting agents (such as leveling, penetrating, or spreading); subcombination compositions of colloid systems containing at least an agent specialized and designed for or peculiar to use in making or stabilizing colloid systems; compositions and subcombination

compositions specialized and designed for or peculiar to use in breaking (resolving) or inhibiting colloid systems; processes of making the compositions or systems of the class; processes of breaking (resolving) or inhibiting colloid systems; in each instance, when generically claimed or there is no art class. Class 516 provides for compositions otherwise seemingly proper for Class 436 when the compositions are colloid systems or wetting agents.

## 26 For metallic ores:

This subclass is indented under subclass 25. Processes or compositions for determining some chemical property of metal containing ore.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 29, for chemical testing of or for mineral oils or carbonaceous minerals.
- 139, for tests performed on hydrocarbons especially subclass 141 for octane tests.

## 27 Using chemical tracers:

This subclass is indented under subclass 25. Processes or compositions wherein chemical tracers are utilized for studying or determining the existence, location or flow of materials within or below the earth's crust.

- (1) Note. The tracers used in the processes classified in this subclass are typically a chemical composition containing a component that is easily detectable and not normally present in the material under study.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 56, for chemical tracer compositions, per se.

SEE OR SEARCH CLASS:

- 250, Radiant Energy, subclasses 253+ for processes of geological testing or irradiation including the use of a radioactive tracer in a well and subclass 301 for a process of determination of oil presence contamination or concentra-

tion and subclasses 302+ for methods of using tracer which emit radiant energy.

## 28

### In situ testing:

This subclass is indented under subclass 25. Processes or compositions wherein the testing is conducted within the earth's crust.

- (1) Note. This subclass is limited to processes wherein the testing device is inserted into the earth's crust.
- (2) Note. This subclass does not include inserting an absorbing medium into a bore hole and subsequently removing the absorbent and determining the amount of gas/carbonaceous products absorbed.

SEE OR SEARCH CLASS:

- 73, Measuring and Testing, subclass 152.07, 152.09, and 152.11 for core sample analysis for making a formation logging, subclasses 152.23+ for fluid flow measuring or fluid analysis combined with sampling well fluid wherein the test is not purely electrical or purely magnetic, and subclasses 863+ for methods and apparatus for sampling liquids not involving a well, or for soil gas sampling methods and apparatus.
- 175, Boring or Penetrating the Earth, subclass 59 for processes of taking solid samples of earth formation combined with a step of retaining fluid therein, or taking a separate fluid sample.
- 250, Radiant Energy, subclasses 253+ for processes of geological testing, or irradiation including the use of a radioactive tracer in a well and subclass 301 for a process of determination of oil presence contamination or concentration and subclasses 302+ for methods of using a tracer which emits radiant energy.
- 324, Electricity: Measuring and Testing, subclasses 323+ for subject matter relating to the determination of an electrical characteristic of the subsurface of the earth, and involving devices in wells.

- 507, Earth Boring, Well Treating, and Oil Field Chemistry, subclasses 100+ for compositions and mere methods of use of said compositions in earth boring and well treating processes. See Class 166, subclasses 305.1, for a more detailed discussion of placing fluid into an earth formation.
- 29 For petroleum oils or carbonaceous minerals:**  
This subclass is indented under subclass 25. Processes of compositions wherein oil gas or carbonaceous materials are sought.
- (1) Note. Included in this subclass are processes in which an adsorbent is placed within a bore hole and gas evolved is collected and then exhausted.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
139, for a test for hydrocarbons including methane.
- SEE OR SEARCH CLASS:  
73, Measuring and Testing, subclasses 19.01+ for the detection of a hydrocarbon gas in seawater; subclasses 23.2+ for a prospecting method for hydrocarbons, subclasses 61.43+ for detection of oil or hydrocarbons in water, and subclasses 152.01+ for a borehole test which is not purely electrical or purely magnetic.
- 30 Removing and testing drilling mud or fluid:**  
This subclass is indented under subclass 29. Processes or compositions wherein drilling mud or drilling fluid is chemically analyzed.
- SEE OR SEARCH CLASS:  
73, Measuring and Testing, subclass 152.04 for drill mud analysis and subclasses 152.23+ for a process or an apparatus for fluid flow measuring or fluid analysis combined with sampling wherein neither the analysis nor the measuring is of a purely electrical type or of a purely magnetic type.
- 31 Removing and testing solid samples:**  
This subclass is indented under subclass 29. Processes or compositions where soil, rock, core samples, etc., are removed from the earth's crust and chemically analyzed.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
85, through 145, for tests for particular compounds not claimed as evolved from a mineral sample.  
139, for tests for particular hydrocarbons.
- SEE OR SEARCH CLASS:  
73, Measuring and Testing, subclass 152.07, 152.09, and 152.11 for core sample analysis for making a borehole formation logging wherein the analysis is not of a purely electrical type or of a purely magnetic type.
- 32 Analyzing evolved gas:**  
This subclass is indented under subclass 31. Processes or compositions where solid samples are chemically treated to evolve a gas and the gas is chemically analyzed.
- (1) Note. The evolution of gas need not be chemical evolution but includes physical treatment to release dissolved or otherwise trapped gas from a sample material.
- (2) Note. Typically the gases evolved include carbon dioxide.
- (3) Note. The test for the gas absent the evolution step would be found in subclasses below.
- (4) Note. The evolved gas is sometimes condensed and the condensate is analyzed.
- 33 Evolving gas by acidification:**  
Processes or compositions under subclasses 32 where the gas is evolved by treating or contacting the solid sample with an acid.
- (1) Note. Typically the processes included in this subclass involve a step of treating the solid sample with a mineral acid, e.g.,  $\text{H}_2\text{SO}_4$ , etc., to evolve gas.

**34 RATE OF REACTION DETERMINATION:**

This subclass is indented under the class definition. Processes or compositions where the change in concentration of a reactant per unit time or the number of moles of a reactant converted to products per unit time are measured.

- (1) Note. This subclass is intended to provide for reaction rate or kinetic studies.
- (2) Note. The term "kinetic" may not occur in the document in question but there will be a description of a determination of a time rate of change of some parameter usually absorbance which is within the meaning of this subclass.

**35 USING ACTIVATED SPECIE:**

This subclass is indented under the class definition. Processes or composition where an unknown specie is determined by contacting the specie with a material that has been activated or excited to a metastable state and analyzing the resulting products or reaction of activated species.

- (1) Note. This subclass takes processes in which materials such as nitrogen, mercury argon, etc., are excited to a metastable state by exposing the material to high frequency discharge, microwave excitation, x-radiation, cold cathode discharges, U.V. lasers, etc., and contacting the excited material with the unknown(s) being monitored or detected.
- (2) Note. This subclass does not include a chemiluminescent species as an activated species.

**36 WITH USE OF CONDENSATION NUCLEI:**

This subclass is indented under the class definition. Processes or materials wherein water or another liquid is deposited on the unknown material in the vapor state to facilitate the optical study of the unknown.

- (1) Note. Generally the material in a gas sample is expanded to obtain a supersaturated condition relative to the gas and participated by use of water vapor.

- (2) Note. Materials examined include ionized particles and molecular species.

**SEE OR SEARCH CLASS:**

- 73, Measuring and Testing, subclasses 28.01+ for the determination of the amount of solid matter in the analysis of gases generally, subclasses 29.01+ for moisture content of gases, and subclasses 863+ for reciprocating and rotary samplers involving gases and liquids.
- 356, Optics: Measuring and Testing, subclass 37, for particle detection by condensation nuclei, subclasses 335+, for the determining of the size of particles by optical methods, subclasses 337+, for particle light scattering generally including the determination of concentration or number of particles by statistical methods, subclasses 437+ for transmission tests through gases for the determination of the concentration of particles present in the gases generally and visual inspection equipment.

**37 TESTING OF CATALYST:**

This subclass is indented under the class definition. Processes or compositions s where compositions specialized and designed for use as a catalyst are chemically analyzed.

- (1) Note. Processes for chemically evaluating the effectiveness of the catalyst are included herein.

**38 PURITY OF STEAM OR INERT GAS:**

This subclass is indented under the class definition. Processes wherein trace amounts of unspecified materials in steam or inert gases are chemically determined.

- (1) Note. This subclass is intended to provide for processes which chemically determine the gross amount of undesired substances present in a sample without regard to the chemical identity of the undesired substance. If the undesired substance is named, classification is not proper herein but should be with the test for the named material.

**SEE OR SEARCH CLASS:**

73, Measuring and Testing, subclass 19.01 for the detection of a hydrocarbon gas in seawater; subclass 23.2 for a prospecting method for hydrocarbons subclasses 61.43+ for detection of oil or hydrocarbons in water and subclasses 152.01+ for bore hole and drilling study.

**39****DETERMINATION OF WATER:**

This subclass is indented under the class definition. Processes or compositions for determining the presence or amount of water by means of a chemical reaction.

**SEE OR SEARCH CLASS:**

73, Measuring and Testing, subclass 75 for a process of moisture determination by electrical or thermal conductivity.

236, Automatic Temperature and Humidity Regulation, subclass 44 for processes in which the humidity of area is controlled and subclass 44 for use of an electrically conductive element.

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, appropriate subclasses for subject matter relating to: colloid systems (such as sols\*, emulsions, dispersions, foams, aerosols, smokes, gels, or pastes) or wetting agents (such as leveling, penetrating, or spreading); subcombination compositions of colloid systems containing at least an agent specialized and designed for or peculiar to use in making or stabilizing colloid systems; compositions and subcombination compositions specialized and designed for or peculiar to use in breaking (resolving) or inhibiting colloid systems; processes of making the compositions or systems of the class; processes of breaking (resolving) or inhibiting colloid systems; in each instance, when generically claimed or there is no art class. Class 516 provides for compositions otherwise seemingly proper for Class 436 when

the compositions are colloid systems or wetting agents.

**40****In petroleum oil, hydrocarbon oil, or organic fluid:**

This subclass is indented under subclass 39. Processes or compositions for the determination of water in petroleum oil, hydrocarbon oil, or organic fluid.

(1) Note. See subclass 60 for further search notes relating to oil testing.

**SEE OR SEARCH CLASS:**

73, Measuring and Testing subclasses 19.01+ for the detection of a hydrocarbon gas in seawater; subclasses 23.2+ for a prospecting method for hydrocarbons; subclasses 61.43+ for detection of oil or hydrocarbon in water, and subclasses 152.01 for bore hole and drilling study.

**41****By use of a cobalt, copper, or nickel containing reagent:**

This subclass is indented under subclass 39. Processes or composition in which a cobalt, copper or nickel containing test material is utilized in a test for water.

**42****By use of a karl fischer reagent:**

This subclass is indented under subclass 39. Processes or compositions in which a reagent composed of a solution including iodine and sulfur dioxide is used to determine the presence, or amount of water.

**43****AUTOMATED CHEMICAL ANALYSIS:**

This subclass is indented under the class definition. Processes wherein sample(s) are analyzed by using self-operated mechanisms or devices.

(1) Note. Included in the subclass are methods of controlling the operation of the self-operated analyzing system, i.e., process control of a chemical test procedure.

(2) Note. Also included in the subclass are the methods of using the various subcombinations of the self-operated analyzer. Exemplary of such subcombinations is the method of aspirating, using aspirating devices of



claimed structure when in such self-operated devices and the use is solely disclosed as in a self-operated chemical analyzer.

- (3) Note. This class does not provide for processes of automatic or condition responsive control of a chemical process except in the case (a) where the claims are so broad as to be unclassifiable in any other chemical class or (b) where there is effected some chemical test in combination with a mechanical or class which excludes chemical reactions or electrical process classifiable in a class which excludes chemical reactions or (c) where the process is that of condition responsive control of an analytical chemical test.

**SEE OR SEARCH CLASS:**

- 73, Measuring and Testing, subclasses 863+ for a sampling process which is not claimed or solely disclosed as part of a process of chemical analysis and the search notes therein for other classes providing for sampling techniques.
- 700, Data Processing: Generic Control Systems or Specific Applications, subclasses 266 through 274 for chemical process control or monitoring systems.
- 702, Data Processing: Measuring, Calibrating, or Testing, subclasses 22+ for chemical analysis data processing.

- 44 Utilizing a moving indicator strip or tape:**  
This subclass is indented under subclass 43. Processes wherein the self operated device utilized includes a moving indicator strip or tape.

**SEE OR SEARCH CLASS:**

- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclass 66 for apparatus for carrying out the process of this subclass.

- 45 Utilizing a centrifuge or compartmented rotor:**  
This subclass is indented under subclass 43. Processes wherein the sample to be analyzed is conveyed in a curvet or container of a turntable

with chemical process stations located about the circumference of the turntable or a centrifuge is utilized.

- (1) Note. Included in this subclass are self-operated devices where the samples are contained within wells in the turntable with the turntable mounted in a housing having the necessary subcombination processing units.

**46 With sample on test slide:**

This subclass is indented under subclass 43. Processes wherein the sample is conveyed via a test slide.

**47 With conveyance of sample along a test line in a container or rack:**

This subclass is indented under subclass 43. Processes wherein samples to be subjected to testing are conveyed in containers, or racks containing a plurality of samples along a pathway along which various physical and chemical processes stations are located for the quantitative and qualitative analysis of the samples.

- (1) Note. Process stations includes physical and chemical operations such as aspirating, detecting, mixing, heating, incubating, analyzing, washing, etc.

**SEE OR SEARCH CLASS:**

- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclass 63 for apparatus for carrying out the process of this subclass.

**48 With step of insertion or removal from test line:**

This subclass is indented under subclass 47. Process wherein the sample containers or racks are fed into or out of the testing pathway.

- (1) Note. This subclass includes processes where the containers or racks are fed into or discharged from the testing pathway at the starting or terminating point of the testing pathway or processes where a container or rack is removed from the testing pathway during its processing for processing at a particular testing station and later reinserted into the testing path-

way for further processing thereby allowing continuous movement of the testing pathway.

**SEE OR SEARCH CLASS:**

73, Measuring and Testing, subclasses 19.01+ and 23.2+ for physical methods of gas analysis especially subclasses 23.35+ for chromatographic analysis.

**49 With treatment or replacement of aspirator element (e.g., cleaning, etc.):**

This subclass is indented under subclass 47. Processes where the aspirating tip or pipette or container is cleaned or wiped or removed or replaced.

**50 Condition or time responsive:**

This subclass is indented under subclass 43. Processes wherein the operation of the self-operated analyzer is controlled responsive to a sensed operating parameter or time sequence.

- (1) Note. Control of industrial processes with feedback or feed-forward control of fluids to or from the process controlled do not belong in this class. They are classified with the appropriate synthesis class providing for the process.

**SEE OR SEARCH CLASS:**

175, Boring or Penetrating the Earth, subclass 59 for process of taking solid samples of earth formation combined with a step of retaining fluid therein or taking a separate fluid sample.

250, Radiant Energy, subclasses 253+ for processes of geological testing or irradiation including the use of a radioactive tracer in a well subclass 310 for a process of determination of oil presence contamination or concentration and subclasses 302+ for methods of using a tracer which emits radiant energy.

324, Electricity: Measuring and Testing, subclasses 323+ for subject matter relating to the determination of an electrical characteristic of the subsurface of the earth, and involving devices in wells.

507, Earth Boring, Well Treating, and Oil Field Chemistry, subclasses 100+ for compositions and mere methods of use of said compositions in earth boring and well treating processes. See Class 166, subclasses 305.1+, for a more detailed discussion of placing fluid into an earth formation.

**51 With automated titrator:**

This subclass is indented under subclass 50. Processes wherein a titration process is controlled by a condition responsive control system.

**SEE OR SEARCH CLASS:**

205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 775+ for electrolytic analysis or testing processes.

**52 With a continuously flowing sample or carrier stream:**

This subclass is indented under subclass 43. Processes wherein a continuously flowing stream of a sample or carrier fluid is formed and flows into and through analysis.

**53 With formation of a segmented stream:**

This subclass is indented under subclass 52. Processes wherein the continuously flowing stream is segmented by alternately injecting a sample, reagent or any number of fluids into a common flow path.

**54 With aspirator of claimed structure:**

This subclass is indented under subclass 43. Processes where the self-operated analyzer utilizes an aspirating means of claimed structure.

**55 CONDITION RESPONSIVE CONTROL:**

This subclass is indented under the class definition. Processes in which (a) a process parameter in a qualitative or quantitative chemical analysis is determined and that or another process parameter of the analysis is changed in response to the analysis or (b) a process parameter in a chemical process is determined by a qualitative or quantitative chemical analysis and some parameter of the process is changed in response to the analysis and such condition responsive control is not otherwise classifiable in the class providing for the chemical process.

- (1) Note. In general each chemical class provides for control of its own processes even when such control is responsive to a qualitative or quantitative chemical analysis. To be properly classifiable in this class a condition responsive control of a process should be unclassifiable in the class providing for the chemical process in question.

**SEE OR SEARCH THIS CLASS, SUB-CLASS:**

- 43, (3) Note.  
50, for process condition responsive control of an automated chemical analyzer.

**SEE OR SEARCH CLASS:**

- 364, Electrical Computers and Data Processing Systems, subclasses 497+ for the use of a data processing system or calculating computer to analyze the results of a chemical reaction which is only nominally claimed.  
422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclass 62 for apparatus for carrying out the process of this class.

**56 TRACERS OR TAGS:**

This subclass is indented under the class definition. Processes or compositions which utilize a chemical composition to identify the origin of a material associated with the chemical composition.

- (1) Note. An example of the subject matter of this subclass would be an explosive composition with additives that are identifiable chemically and indicate the producer of the explosive.

**SEE OR SEARCH CLASS:**

- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, appropriate subclasses for subject matter relating to: colloid systems (such as sols\*, emulsions, dispersions, foams, aerosols, smokes, gels, or pastes) or wetting agents (such as leveling, penetrating, or

spreading); subcombination compositions of colloid systems containing at least an agent specialized and designed for or peculiar to use in making or stabilizing colloid systems; compositions and subcombination compositions specialized and designed for or peculiar to use in breaking (resolving) or inhibiting colloid systems; processes of making the compositions or systems of the class; processes of breaking (resolving) or inhibiting colloid systems; in each instance, when generically claimed or there is no art class. Class 516 provides for compositions otherwise seemingly proper for Class 436 when the compositions are colloid systems or wetting agents.

**57 INCLUDING USE OF RADIOACTIVE PROPERTIES:**

This subclass is indented under the class definition. Processes or compositions wherein analysis or a chemical reaction includes measurement of radioactivity.

- (1) Note. This subclass includes scintillation counting and sample preparation by pyrolysis or combustion.

**SEE OR SEARCH THIS CLASS, SUB-CLASS:**

- 82+, for the chemical testing of radioactive materials.

**SEE OR SEARCH CLASS:**

- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, appropriate subclasses for subject matter relating to: colloid systems (such as sols\*, emulsions, dispersions, foams, aerosols, smokes, gels, or pastes) or wetting agents (such as leveling, penetrating, or spreading); subcombination compositions of colloid systems containing at least an agent specialized and designed for or peculiar to use in making or stabilizing colloid systems; compositions and subcombination compositions specialized and designed for or peculiar to use in

- breaking (resolving) or inhibiting colloid systems; processes of making the compositions or systems of the class; processes of breaking (resolving) or inhibiting colloid systems; in each instance, when generically claimed or there is no art class. Class 516 provides for compositions otherwise seemingly proper for Class 436 when the compositions are colloid systems or wetting agents.
- 600, Surgery, subclasses 407+ for methods for detecting radiation emanating from a radioactive material in the body.
- 58 Dosage determination of high energy radiation (e.g., use of an X-ray dosimeter, etc.):**  
This subclass is indented under subclass 57. Processes or compositions which determine by means of a chemical reaction, the exposure to radiation of wavelengths of less than  $1.4 \times 10^{-7}$  cm.
- 59 Including pyrolysis of radioactive material:**  
This subclass is indented under subclass 57. Processes or compositions which include a step or pyrolysis of a sample material at least part of which is radioactive.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
155+, for processes of chemical analysis including a step of pyrolysis.
- 60 LUBRICANT, GREASE, MINERAL OILS, HYDROCARBON OIL PRODUCT, OR FATS OR LIPIDS FOR OXIDATION (E.G., BREAKDOWN PRODUCTS OR CONTAMINATION, ETC.):**  
This subclass is indented under the class definition. Processes or compositions in which a lubricant, fat or oil is tested for oxidation products, for products of the breakdown of the fat or oil, or for contamination.
- (1) Note. These tests include: amount of unsaturated acids in fats, oils or gasoline; refrigeration oil analysis; acid and base content; neutralization number; metal content; antioxidant effectiveness; detergency of lubricating oils; chemicals in oil; organic solvent tests; oxidation of fats or lipids.
- SEE OR SEARCH CLASS:  
73, Measuring and Testing, subclasses 28.01+ for testing for solid matter entrained in a gas, subclasses 61.71+ for the testing of a liquid for sediment or foreign material content where more than a visual or photoelectric test of the color or the amount of visible radiant energy transmitted through or scattered by the liquid involved, and subclasses 53.05+ for lubricant testing.
- 116, Signals and Indicators, subclass 206 for visual indicators, per se, where no color or other optical comparison test is involved and for level indicators of the mechanical type.
- 356, Optics: Measuring and Testing, subclass 51 for tests of oil which may involve infrared radiation; subclass 70, for determining the physical properties of oil by the optical response produced by visible light transmitted through or reflected by the oil; subclass 128, for refraction test devices which may be applicable for testing of oil; subclasses 364+, for polarization test devices which may be applicable for testing of oil; subclass 402, for color test devices which may be applicable for the testing of oil.
- 432, for transmission test devices particularly particle suspension tests.
- 445, for reflection test devices which may be applicable to the testing of oil.
- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, appropriate subclasses for subject matter relating to: colloid systems (such as sols\*, emulsions, dispersions, foams, aerosols, smokes, gels, or pastes) or wetting agents (such as leveling, penetrating, or spreading); subcombination compositions of colloid systems containing at least an agent specialized and designed for or peculiar to use in making or stabilizing colloid systems; compositions and subcombination compositions specialized and

designed for or peculiar to use in breaking (resolving) or inhibiting colloid systems; processes of making the compositions or systems of the class; processes of breaking (resolving) or inhibiting colloid systems; in each instance, when generically claimed or there is no art class. Class 516 provides for compositions otherwise seemingly proper for Class 436 when the compositions are colloid systems or wetting agents.

**61 Acidity, basicity or neutralization number:**  
This subclass is indented under subclass 60. Processes or compositions in which acidity or basicity of a lubricant is determined.

**62 OXYGEN DEMAND (E.G., BOD, TOD, COD, ETC.):**  
This subclass is indented under the class definition. Subject matter wherein oxidizable matter in an aqueous sample is determined.

- (1) Note. Three principle oxygen demand tests are Biological Oxygen demand (BOD), Chemical Oxygen demand (COD) and Total Oxygen demand (TOD). BOD = measure of organic matter in sample in terms of the amount of oxygen the sample will consume when organic matter is eliminated. COD = measure of the organic matter in a sample that is susceptible to oxidation by a strong chemical oxidant. TOD = amount of oxygen required when the combustible materials in a sample burn in the presence of an oxygen containing feed stream.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 133, for processes of carbon content determination which include a step of converting the carbon content of a sample to carbon dioxide.
- 146, for processes of determination of total organic carbon.

SEE OR SEARCH CLASS:

- 600, Surgery, subclass 529 for determination of metabolic rate by a method which measures the rate of oxygen

consumption of a living body by means contacting or in a living body.

### **63 BIOLOGICAL CELLULAR MATERIAL TESTED:**

This subclass is indented under the class definition. Subject matter wherein the material analyzed is a cellular material obtained from biological fluids or tissue.

- (1) Note. This subclass includes tests on red and white corpuscles, blood platelets, tissue cells, etc.
- (2) Note. This subclass does not include test for clotting factor, see subclass 69.
- (3) Note. Hemolysis tests are classified here.
- (4) Note. This subclass does not include sedimentation rate and hematocrit, see subclass 70.

### **64 CANCER:**

This subclass is indented under the class definition. Processes or compositions which chemically detect the presence of cancer.

SEE OR SEARCH THIS CLASS, SUBCLASS:

500+, for an immunological test for cancer.

SEE OR SEARCH CLASS:

424, Drug, Bio-Affecting and Body Treating Compositions, subclasses 9.1+ for an in vivo determination of cancer.

### **65 PREGNANCY OR OVULATION:**

This subclass is indented under the class definition. Processes s for determining pregnancy or ovulation.

SEE OR SEARCH CLASS:

73, Measuring and Testing, subclasses 54.01+ for ovulation tests wherein the viscosity of the vaginal fluid is measured.

### **66 HEMOGLOBIN, MYOGLOBIN OR OCCULT BLOOD:**

This subclass is indented under the class definition. Process or compositions which test for hemoglobin, myoglobin or trace blood.

- (1) Note. The substances classified herein are often referred to as peroxidatively active.
- SEE OR SEARCH CLASS:
- 600, Surgery, subclass 368 for methods and apparatus of measuring a physical characteristic of blood by means placed against or in the body and subclass 371 for methods of detecting bleeding.
- 67 Glycosylated hemoglobin:**  
This subclass is indented under subclass 66. Processes wherein glycosylated hemoglobin is subject to a qualitative or quantitative chemical analysis.
- 68 BLOOD GAS (E.G., OXYGEN, CARBON DIOXIDE, BLOOD pH, ETC.):**  
This subclass is indented under the class definition. Processes wherein gases in the blood are determined.
- (1) Note. Blood and pH gases such as O<sub>2</sub>, CO and CO<sub>2</sub> are determined.
- SEE OR SEARCH CLASS:
- 324, Electricity: Measuring and Testing, subclasses 71.1+, 425+, 438, 439+ particularly 446 and 450 for electrical tests performed on blood such as sedimentation, PH, or blood gas.
- 69 CLOTTING OR CLOTTING FACTOR LEVEL TESTS:**  
This subclass is indented under the class definition. Processes or compositions, for performing clotting tests and factor level tests.
- (1) Note. Examples of the tests included here are: P.T. Prothrombin time, APPT. Activated partial prothrombin time, T.T. Thromboplastin Test, P.P Prothrombin and Procovertin Test
- SEE OR SEARCH CLASS:
- 73, Measuring and Testing, subclasses 61.65+ for testing the settling rate of liquid suspensions of solids.
- 356, Optics: Measuring and Testing, particularly subclasses 40+ for a transmissive, or reflective optical measurement or test performed on blood such as statistical counting of blood component particles, determination of hemoglobin content or determination of oxyhemoglobin in blood.
- 359, Optics: Systems (Including Communication) and Elements, for the counting of blood cells or particles one by one.
- 377, Electrical Pulse Counters, Pulse Dividers, or Shift Registers: Circuits and Systems, subclasses 10+ for particle counters with or without the sizing of the particles counted.
- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclass 73 for apparatus for carrying out the process of this subclass.
- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, appropriate subclasses for subject matter relating to: colloid systems (such as sols\*, emulsions, dispersions, foams, aerosols, smokes, gels, or pastes) or wetting agents (such as leveling, penetrating, or spreading); subcombination compositions of colloid systems containing at least an agent specialized and designed for or peculiar to use in making or stabilizing colloid systems; compositions and subcombination compositions specialized and designed for or peculiar to use in breaking (resolving) or inhibiting colloid systems; processes of making the compositions or systems of the class; processes of breaking (resolving) or inhibiting colloid systems; in each instance, when generically claimed or there is no art class. Class 516 provides for compositions otherwise seemingly proper for Class 436 when the compositions are colloid systems or wetting agents.
- 600, Surgery, for diagnostic methods which utilize light sensing units on or

in the body for the testing or the inspection of blood and subclass 368 for a method wherein a physical characteristic of blood is measured by means placed against or in the body, e.g., time required for blood to clot, sedimentation rate, white cell count or viscosity.

**70 SEDIMENTATION RATE OR HEMATOCRIT:**

This subclass is indented under the class definition. Processes wherein the sedimentation rate or hematocrit are determined.

**SEE OR SEARCH CLASS:**

324, Electricity: Measuring and Testing, subclasses 71.1+, 425+, 438, 439+ particularly 446 and 450 electrical tests performed on blood such as sedimentation, PH or blood gas.

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, appropriate subclasses for subject matter relating to: colloid systems (such as sols\*, emulsions, dispersions, foams, aerosols, smokes, gels, or pastes) or wetting agents (such as leveling, penetrating, or spreading); subcombination compositions of colloid systems containing at least an agent specialized and designed for or peculiar to use in making or stabilizing colloid systems; compositions and subcombination compositions specialized and designed for or peculiar to use in breaking (resolving) or inhibiting colloid systems; processes of making the compositions or systems of the class; processes of breaking (resolving) or inhibiting colloid systems; in each instance, when generically claimed or there is no art class. Class 516 provides for compositions otherwise seemingly proper for Class 436 when the compositions are colloid systems or wetting agents.

**71 LIPIDS, TRIGLYCERIDES, CHOLESTEROL, OR LIPOPROTEINS:**

This subclass is indented under the class definition. Processes or compositions for determining lipids, triglycerides, cholesterol and lipoproteins.

(1) Note. Steroid-broadly recited is classified as a hydrocarbon in subclass 139. If a steroid is specifically recited it is originally classified in an appropriate subclass and crossed into 139.

(2) Note. Estrogen is a steroid lipid and is therefore originally classified with cholesterol.

**72 SILICON CONTAINING:**

This subclass is indented under the class definition. Processes or compositions for chemically testing silicon or silicon containing organic or inorganic compounds.

**73 METAL OR METAL CONTAINING:**

This subclass is indented under the class definition. Processes or compositions in which the species sought is a metal or metal containing compound or composition.

(1) Note. Ions are classified with their unionized form.

**74 Present in biological fluids (e.g., blood, urine, etc.):**

This subclass is indented under subclass 73. Processes or composition which determine the metal present in a fluid derived from a living body.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

63, for chemical tests performed on biological materials with intact cells.

**75 Oxide or gas content of metal (e.g., determination of dissolved gases, etc.):**

This subclass is indented under subclass 73. Processes or compositions which determine the metallic or nonmetallic oxide content or determine the included gases in a mass of metal.

- 76 Organometallic compound determined:**  
This subclass is indented under subclass 73. Processes or compositions which determine a compound containing carbon covalently bonded to metal.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
66, for tests for hemoglobin.
- 77 Ge, Sn, Pb:**  
This subclass is indented under subclass 76. Processes or compositions which determine the presence or amount of an organometallic compound of tin, lead or germanium.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
74, for tests to determine the lead content of blood.
- 78 Presence of a component of steel:**  
This subclass is indented under subclass 73. Processes or compositions for the analysis of components of iron carbon alloys.
- (1) Note. It is conclusively presumed that any composition denominated steel will come within the definition of this subclass.
- 79 Li, Na, K, Rb, Cs, Fr, Be, Mg, Ca, Sr, Ba, Ra:**  
This subclass is indented under subclass 73. Processes or compositions for the analysis of lithium, sodium, potassium, rubidium, cesium, beryllium, magnesium, calcium, strontium, barium, or radium.
- (1) Note. This subclass provides for water hardness tests even though the hardness is indirectly determined as by use of a chelating agent.
- 80 Cu, Ag, Au:**  
This subclass is indented under subclass 73. Processes or compositions for analysis of copper, silver or gold.
- 81 Zn, Cd, Hg, Sc, Y, or Actinides, or Lanthanides:**  
This subclass is indented under subclass 73. Processes for the analysis of zinc, cadmium, mercury, scandium, yttrium or elements with atomic numbers 57-71 or 89 or higher.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
57, for analysis of metals dependent upon radioactivity.
- 82 Lanthanide or Actinides:**  
This subclass is indented under subclass 81. Processes or compositions directed to the analysis of elements with atomic numbers 57-71 or 89-103 inclusive.
- (1) Note. The Lanthanides are: La (Lanthanum), Ce (Cerium), Pr (Praseodymium), Nd (Neodymium), II (Illinium) or Pm (Promethium), Sm (Samarium), Eu (Europium), Gd (Gadolinium), Tb (Terbium), Dy (Dysprosium), Ho (Holmium), Er (Erbium), Tm (Thulium), Y (Ytterbium), and Lu (Lutecium).
- (2) Note. The Actinides are: Elements with atomic numbers 89-103 inclusive, Ac (Actinium), Th (Thorium), Pa (Protactinium), U (Uranium), Np (Neptunium), Pu (Plutonium), Am (Americurium), BK (Berkelium), Cf (Californium), Es (Einsteinium), Fm (Fermium), Md (Mendelevium), No (Nobelium), and Lw (Lawrenceium).
- 83 Ti, Zr, Hf, Va, Nb, Ta, Cr, Mo, W:**  
This subclass is indented under subclass 73. Processes for analysis of titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum or wolfram (tungsten).
- 84 Mn, Tc, Re, Fe, Ru, Os, Co, Rh, Ir, Ni, Pd, Pt:**  
This subclass is indented under subclass 73. Processes or compositions for analysis of manganese, technetium, rhenium, iron, cobalt, nickel, ruthenium, rhodium, palladium, osmium, iridium and platinum.



**85 SYNTHETIC OR NATURAL RESIN:**

This subclass is indented under the class definition. Processes or compositions, or in which a resin is subjected to a qualitative, or quantitative chemical analysis.

- (1) Note. Resin is defined coterminously with the Class 520 definition.
- (2) Note. Measurement of physical property (i.e., electrical resistivity) of an on going polymerization process to obtain optimum operating conditions is classified below under technique used.
- (3) Note. Resin polymer stability tests, i.e., temperature, light, oxidative, reductive stability, are classified with the polymer.
- (4) Note. A process investigating the hardening time of a resin is presumed to be a chemical testing process in the absence of a clear showing to the contrary.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 4, for method and materials for chemically determining the crystallinity of a polymer.
- 72, for silicon containing polymers.

**86 PEPTIDE, PROTEIN, OR AMINO ACID:**

This subclass is indented under the class definition. Subject matter in which the chemical specie subject to qualitative or quantitative chemical analysis is an (1) amino acid, (2) two or more amino acids residues linked by a peptide bond, (i.e., amide linkage) or (3) a compound containing both peptide and saccharide moieties.

- (1) Note. A determination of total protein is a determination of the total albumin and globulins in a sample.

SEE OR SEARCH CLASS:

- 106, Compositions: Coating or Plastic, for protein containing coating or plastic compositions, particularly subclass 4, 31.24, 31.53, 31.82, 31.94, 38.4, 124+, 614, 645, and indented subclasses.

- 424, Drug, Bio-Affecting and Body Treating Compositions, especially subclasses 400+ for a composition of that class in a protein ingestible capsule.
- 426, Food or Edible Material: Processes, Compositions, and Products, appropriate subclasses, especially subclass 63, 92, 105, for edible protein compositions or products and related process involving the same.
- 428, Stock Material or Miscellaneous Articles, for a nonstructural stock material product in the form of a composite web or sheet including a layer comprising protein, and other appropriately titled subclasses (e.g., subclass 435 and 458).
- 435, Chemistry: Molecular Biology and Microbiology, subclasses 68.1+ for microbial synthesis of peptides, subclass 106, for synthesis of amino acids and 91.3 for synthesis of ribonucleic acids, subclass 6 for tests for nucleic acid.
- 514, Drug, Bio-Affecting and Body Treating Compositions, subclasses 2+ for a composition containing peptide or protein.
- 530, Chemistry: Natural Resins or Derivatives; Peptides or Proteins; Lignins or Reaction Products Thereof, subclasses 300+ for peptides and proteins and their reaction products.
- 536, Organic Compounds, for nucleic acids and processes of chemical synthesis thereof.
- 562, Organic Compounds, subclass 516 for amino acids produced from protein.

**87 Glycoproteins (e.g., hormones, etc.):**

This subclass is indented under subclass 86. Subject matter in which a protein or peptide is covalently bonded to a saccharide.

- (1) Note. Glycoproteins classified in this and the indented subclasses represent only a small portion of glycopeptide testing processes. Enzymes, immunoglobulins, antibodies and subcellular parts of cells represent large bodies of art classified elsewhere.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

500+, for tests involving antigens and antibodies many of which are glycoproteins.

SEE OR SEARCH CLASS:

435, Chemistry: Molecular Biology and Microbiology, for tests by and for enzymes particularly subclass 23 and 24, for tests involving proteins and peptides.

**88**

**Albumin:**

This subclass is indented under subclass 87. Subject matter in which the specie of intent is albumin.

(1) Note. Albumin is a commonly used immunogenic carrier and such use is provided for in subclasses 500+ of this class and in 530 subclasses 362+.

SEE OR SEARCH CLASS:

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, appropriate subclasses for subject matter relating to: colloid systems (such as sols\*, emulsions, dispersions, foams, aerosols, smokes, gels, or pastes) or wetting agents (such as leveling, penetrating, or spreading); subcombination compositions of colloid systems containing at least an agent specialized and designed for or peculiar to use in making or stabilizing colloid systems; compositions and subcombination compositions specialized and designed for or peculiar to use in breaking (resolving) or inhibiting colloid systems; processes of making the compositions or systems of the class; processes of breaking (resolving) or inhibiting colloid systems; in each instance, when generically claimed or there is no art class. Class 516 provides for compositions otherwise seemingly proper for Class 436 when the compositions are colloid systems or wetting agents.

530, Chemistry: Natural Resins or Derivatives; Peptides or Proteins; Lignins or Reaction Products Thereof, subclasses 362+ for processes under that class definition involving albumin or reaction products thereof.

**89**

**Amino acid or sequencing procedure:**

This subclass is indented under subclass 86. Subject matter in which (a) the specie of interest is an organic compound that contains both a basic amino group and a acidic carboxyl group or (b) a process of analysis of a peptide in which the identity and order of the amino acid residues in the peptide are determined.

(1) Note. The peptide need not be completely sequenced; a procedure to determine as few as two units would be properly classifiable herein.

**90**

**Alpha or beta amino acid:**

This subclass is indented under subclass 89. Subject matter in which a primary or secondary amino group is bonded to the alpha or beta carbon of the amino acid.

**91**

**HETEROCYCLIC CARBON COMPOUND (I.E., O, S, N, Se, Te, AS ONLY RING HETERO ATOM):**

This subclass is indented under the class definition. Subject matter involving the qualitative or quantitative chemical analysis of a carbon compound which contains a ring composed of carbon and at least one element from the group consisting of nitrogen, sulfur, selenium, tellurium or oxygen and not other atoms.

(1) Note. Included herein are analysis involving heterocyclic acid anhydrides, lactones or lactams.

SEE OR SEARCH CLASS:

540, through 549, Organic Compounds, for processes of synthesis of heterocyclic carbon compounds.

**92**

**Diverse hetero atoms in same or different rings (e.g., alkaloids, opiates, etc.):**

This subclass is indented under subclass 91. Subject matter in which (a) a single carbon ring has more than one diverse hetero atom or (b) a fused- or bridged-ring system has diverse hetero atoms in one or more of the carbon rings.

- (1) Note. This subclass provides for (a) alkaloids which include opiates such as morphine, codeine, strychnine, quinine, cocaine, and nicotine and (b) phenothazines such as chlopromazine, trifluoperazine, and triflupromazine.
- 93 Hetero-O (e.g., ascorbic acid, etc.):**  
This subclass is indented under subclass 91. Subject matter in which the hetero ring contains only oxygen as the hetero atom.
- (1) Note. Included herein are tests for the active constituents of the cannabis drugs, i.e., derivatives of cannabitol especially tetrahydrocannabinol. Broadly claimed tests for marijuana are included herein in the absence of a clear showing that the test is for a nonhetero-O containing derivative of cannabitol, typically a hydroxyl or carboxylic acid substituted hydrocarbon.
- 94 Saccharide (e.g., DNA, etc.):**  
This subclass is indented under subclass 93. Subject matter in which the substance subjected to chemical analysis is or contains a saccharide.
- (1) Note. A sugar or carbohydrate is presumed to be a saccharide.
- 95 Glucose:**  
This subclass is indented under subclass 94. Subject matter in which the saccharide is glucose.
- 96 Hetero-N:**  
This subclass is indented under subclass 91. Subject matter in which the hetero ring contains only nitrogen as the hetero atom.
- (1) Note. This subclass provides for hetero rings with multiple nitrogen ring atoms as well as ring system with nitrogen in diverse rings.
- (2) Note. Paraquat and phencyclidine would be provided for in this subclass as would nicotine or nicotinic acid.
- 97 Bile pigment:**  
This subclass is indented under subclass 96. Subject matter the degradation products of heme are detected.
- (1) Note. Bile pigments include: bilirubin, dihydrobilirubin, Mesobilirubin, urobilin, urobilinogen, urobilin and stercobilin.
- 98 Plural nitrogen in the same ring (e.g., barbiturates, creatinine, etc.):**  
This subclass is indented under subclass 96. Subject matter in which the compound to be analyzed contains a hetero ring with two or more nitrogen atoms as members of the same ring.
- (1) Note. This subclass provides for (a) barbituric acid derivatives including dephenylhydantoin, phenobarbital, secobarbital, pentobarbital, amobarbital, aprobarbital and thiopental and (b) paraquat.
- 99 Uric acid:**  
This subclass is indented under subclass 98. Subject matter wherein the specie of interest is triketopurine.
- 100 INORGANIC ACID OR BASE (E.G., HCl, SULFURIC ACID, ETC.):**  
This subclass is indented under the class definition. Subject matter for testing for mineral acids or bases.
- (1) Note. This subclass is intended to provide for tests for simple inorganic acids such as sulfuric and nitric, etc. Many elaborate theories of acidity and basicity exist, if to classify a document herein one of these theories is used, classification herein is incorrect.
- 101 Halogen containing:**  
This subclass is indented under subclass 100. Subject matter which contains, chlorine, bromine, fluorine, iodine or astatine.
- 102 Sulfur containing:**  
This subclass is indented under subclass 100. Subject matter wherein the acid determined contains sulfur.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
119+, for compositions and processes for determination of sulfur dioxide which may include aqueous solutions thereof.
- 103 PHOSPHORUS CONTAINING:**  
This subclass is indented under the class definition. Subject matter in which the compound or composition to be investigated is or contains phosphorus.
- 104 Organic (e.g., chemical warfare agents, insecticides, etc.):**  
This subclass is indented under subclass 103. Subject matter in which the compound containing phosphorus is organic.
- (1) Note. See subclass 133 for a definition or organic.
- (2) Note. This subclass primarily provides for insecticides and chemical warfare agents e.g., G agents, anticholinesterase agent, etc.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
71, for a qualitative or quantitative tests for phospholipids especially lecithin.
- 105 Of inorganic phosphorus compound in body fluid:**  
This subclass is indented under subclass 103. Subject matter involving a quantitative or a qualitative test for inorganic phosphorus in a fluid produced by or taken from the body.
- (1) Note. Typically the body fluid is blood serum.
- 106 NITROGEN CONTAINING:**  
This subclass is indented under the class definition. Subject matter in which the compound or composition to be investigated is or contains nitrogen.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
86+, for proteins, peptides and amino acids.  
94, for nitrogen containing saccharides.
- 96+, for nitrogen containing hetero compounds.
- 107 N-Nitroso containing (e.g., nitrosamine, etc.):**  
This subclass is indented under subclass 106. Subject matter in which the nitrogen containing species is the radical=N-NO.
- 108 Urea or blood urea nitrogen:**  
This subclass is indented under subclass 107. Subject matter in which a test is directed to a qualitative or quantitative test for  $N_2$  - CO -  $N_2$  or is directed to a determination of blood urea nitrogen.
- 109 Cyanide or isocyanide:**  
This subclass is indented under subclass 106. Subject matter in which the specie to be determined contains the - C=N or - N=C radical.
- 110 Nitrite or nitrate:**  
This subclass is indented under subclass 106. Subject matter in which the specie determined is (1) a salt of nitric acid, or compound containing the radical -NO<sub>3</sub> or (2) a salt of nitrous acid or a compound containing the radical -NO<sub>2</sub>.
- (1) Note. This subclass does not provide for nitrogen oxide gases.
- 111 Amine and quaternary ammonium:**  
This subclass is indented under subclass 106. Subject matter in which the specie to be determined contains an amino group.
- (1) Note. Amines R is an organic radical
- Primary =  $H_2N^r$ ; Secondary =  $R H N R$  (imines); Tertiary =  $R_2NR$ ; Quaternary =  $R_4NOH$  (ammonium) Amide -CONH<sub>2</sub>
- (2) Note. This subclass would provide for aralkylamines such as amphetamine, methamphetamine, methadone, propylphenyl, and methaqualone.
- 112 Tertiary amine:**  
This subclass is indented under subclass 111. Subject matter in which the specie tested for is  $NR_3$  where R is an organic radical.

- 113 Ammonia:**  
This subclass is indented under subclass 106. Subject matter in which the specie tested for in  $\text{NH}_3$ .
- 114 Total nitrogen determined:**  
This subclass is indented under subclass 106. Subject matter in which the total quantity of nitrogen present in a sample is determined without regard for the specific identity of the compound which contains the nitrogen.
- 115 As part of an elemental analysis:**  
This subclass is indented under subclass 114. Subject matter in which the total nitrogen content is determined as part of an elemental analysis in which at least one other element is quantitatively determined.
- 116 Oxides of nitrogen:**  
This subclass is indented under subclass 106. Subject matter in which the specie to be tested is composed solely of nitrogen and oxygen.
- 117 Only nitrogen dioxide:**  
This subclass is indented under subclass 116. Subject matter in which nitrogen dioxide is the only nitrogen oxide determined.
- (1) Note.  $\text{NO}_2$  may be in admixture with other gases  $\text{NO}_x$ ,  $\text{CO}_2$ ,  $\text{SO}_2$ , etc., but is the only gas quantitatively detected.
- 118 Both nitrogen oxide and dioxide:**  
This subclass is indented under subclass 116. Subject matter in which both nitric and nitrous oxide are determined.
- 119 SULFUR CONTAINING:**  
This subclass is indented under the class definition. Subject matter in which the compound or composition to be investigated is or contains sulfur.
- (1) Note. As used herein sulfur oxide includes gaseous sulfur dioxide and its aqueous solution but does not include sulfur trioxide, sulfuric acid or its salts which are classified in subclass 102 above.
- (2) Note. This subclass is intended to provide for tests for "sulfur radicals", e.g., sulfate, etc., for a determination of the total sulfur present without reference to the particular compound or radical containing the sulfur.
- 120 Organic or sulfhydryl containing (e.g., mercaptan, hydrogen sulfide, etc.):**  
This subclass is indented under subclass 119. Subject matter in which (1) an organic sulfur containing specie or (2) a specie containing the -Sh radical is sought by qualitative or quantitative chemical analysis.
- (1) Note. The sulfhydry radical is -SH and thus includes mercaptans and thiois, and hydrosulfides.
- (2) Note. See subclass 133 for a definition of organic.
- (3) Note. This subclass provides for hydrogen sulfide and mercaptan tests. These tests are also referred to as sulfhydryl or hydrosulfide test.
- 121 Only hydrogen sulfide:**  
This subclass is indented under subclass 120. Subject matter in which the only test preferred for a sulfur compound is for hydrogen sulfide.
- (1) Note.  $\text{H}_2\text{S}$  can be in admixture with other gases but is the only gas detected or determined.
- 122 Sulfur dioxide:**  
This subclass is indented under subclass 119. Subject matter in which  $\text{SO}_2$ , per se, is the specie which is subject to a quantitative or qualitative chemical analysis.
- 123 Total or elemental sulfur:**  
This subclass is indented under subclass 119. Subject matter in which (1) the total sulfur content of a sample is determined or (2) the total elemental sulfur is determined.
- (1) Note. The total sulfur may be in the form of a variety of sulfur compounds but are included herein where there is no

- analysis for their identity, with only the total amount determined.
- (2) Note. Total sulfur can be sulfur content of organic and/or inorganic materials.
- 124 HALOGEN CONTAINING:**  
This subclass is indented under the class definition. Subject matter in which the compound or composition to be investigated is or contains halogen.
- 125 In aqueous solution:**  
This subclass is indented under subclass 124. Subject matter in which the specie investigated is in an aqueous solution.
- (1) Note. An aqueous solution includes body fluids.
- 126 Carbon containing compound (e.g., vinyl-chloride, etc.):**  
This subclass is indented under the class definition. Subject matter in which the specie to be investigated is a compound containing halogen, carbon and hydrogen.
- 127 OXYGEN CONTAINING:**  
This subclass is indented under the class definition. Subject matter in which the compound or composition to be investigated is or contains oxygen.
- 128 Carbonyl, ether, aldehyde or ketone containing:**  
This subclass is indented under subclass 127. Subject matter in which the specie to be investigated contains R-C=O, R-O-R, RCHO or RCOOH.
- (1) Note. This and the indented subclass will provide for tests for fatty oils and higher fatty acids, i.e., C<sub>7</sub><sup>+</sup>.
- (2) Note. A ketone body test is classified here even though acetone is specifically disclosed as the ketone body.
- 129 Carboxylic acid:**  
This subclass is indented under subclass 128. Subject matter in which the specie to be investigated contains a carboxylic acid functional group.
- (1) Note. Acetic acid and salicylic acid are classifiable herein.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
89, and 90, for chemical tests for amino acids.
- 130 Formaldehyde or acetone:**  
This subclass is indented under subclass 128. Subject matter in which the specie investigated is HCHO or CH<sub>3</sub>COCH<sub>3</sub>.
- 131 Hydroxyl containing:**  
This subclass is indented under subclass 127. Subject matter in which the investigated specie contains a hydroxyl group i.e., R-OH.
- (1) Note. Glycerol and glycerine are synonymous with 1, 2, 3 propanetriol. Glucose is a saccharide classifiable in subclass 95.
- 132 Ethanol:**  
This subclass is indented under subclass 131. Subject matter in which the specie investigated is ethanol.
- SEE OR SEARCH CLASS:  
600, Surgery, subclass 532 for methods of qualitative or quantitative analysis of a particular component of the breath by means placed against or in the body.
- 133 Inorganic carbon compounds:**  
This subclass is indented under subclass 127. Subject matter in which there is a qualitative or quantitative chemical test for inorganic compound of carbon.
- (1) Note. Organic compounds are compounds containing carbon which are further characterized by the presence of two carbon atoms bonded together or one atom of carbon bonded to at least one atom of hydrogen or halogen or one atom of carbon bonded to one atom of nitrogen by a single or double bond.

**134 Carbon monoxide only:**

This subclass is indented under subclass 133. Subject matter in which the only chemical specie tested for is carbon monoxide.

**135 Ozone or peroxide:**

This subclass is indented under subclass 127. Subject matter in which the qualitative or quantitative chemical test is for O<sub>3</sub> or for an organic or inorganic peroxide.

**136 Molecular oxygen:**

This subclass is indented under subclass 127. Subject matter in which there is a qualitative or quantitative test for molecular oxygen.

**137 Fuel/air mixture or exhaust gas analysis:**

This subclass is indented under subclass 136. Subject matter in which the fluid tested for the presence of molecular oxygen is either a fuel/air mixture or the exhaust gas from some process.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 116, for analysis of gas streams for their nitrogen oxides content.
- 134, for analysis of gas streams for their carbon monoxide content.
- 143, for analysis of gas streams for the residual hydrocarbon content, flammability or hydrogen or hydrocarbon content in an air/fuel mixture.

**138 Dissolved or trace oxygen or oxygen content of a sealed environment:**

This subclass is indented under subclass 136. Subject matter in which the molecular oxygen is present (a) dissolved in a liquid (b) is denominated as a trace, residuum, etc. or (c) in which the test is directed to the detection of the oxygen content of a confined space which is isolated from the atmosphere.

**139 HYDROCARBON:**

This subclass is indented under the class definition. Subject matter in which there is a qualitative or quantitative chemical analysis of compounds which consist of carbon and hydrogen only.

- (1) Note. Coal has arbitrarily been classified as a hydrocarbon.

- (2) Note. A claim broadly reciting "organic compound" with a shotgun disclosure is originally classified on the basis of analysis technique in subclasses 147 through 181 and desirably cross-referenced to this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 62, for determination of BOD, COD or TOD which may include the detection of hydrocarbons.

SEE OR SEARCH CLASS:

- 73, Measuring and Testing, subclasses 19.01+ for the detection of hydrocarbon gas in seawater; subclasses 23.2+ for a prospecting method for hydrocarbons; subclasses 61.43+ for detection of oil or hydrocarbons in water and subclass 152.01 for bore hole and drilling study.
- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 775+ for electrolytic analysis or testing processes, especially subclass 787 for electrolytic determination of an organic compound.
- 250, Radiant Energy, subclass 301 for methods involving radiant energy for determination of oil presence, contamination or concentration.

**140 Aromatic:**

This subclass is indented under subclass 139. Subject matter in which the qualitative and quantitative chemical analysis is for a compound containing one or more aromatically unsaturated rings.

**141 Acyclic (e.g., methane, octane, isoparaffin, etc.):**

This subclass is indented under subclass 139. Subject matter in which the hydrocarbon is linear.

- (1) Note. Octane and gasoline tests are classifiable here.

- 142 Unsaturated (e.g., ethylene, diene, etc.):**  
This subclass is indented under subclass 141. Subject matter in which the hydrocarbon possesses one or more double or triple bonds between two or more carbon atoms.
- 143 Total hydrocarbon, flammability, combustibility (e.g., air-fuel mixture, etc.):**  
This subclass is indented under subclass 139. Subject matter in which (a) the total hydrocarbon content of a sample is determined without regard to the identity of the hydrocarbon or (b) the flammability or combustibility of a mixture is determined, or (c) a combustible gas test.
- (1) Note. A test broadly claimed as for combustible content should be originally classified in subclasses 147+ and desirably cross-referenced here if a hydrocarbon is disclosed.
- 144 HYDROGEN, PER SE:**  
This subclass is indented under the class definition. Subject matter in which the test is for molecular hydrogen.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
163, for hydrogen ion content test, i.e., pH.
- 145 CARBON CONTAINING:**  
This subclass is indented under the class definition. Subject matter in which elemental carbon content or presence is determined.
- 146 In an aqueous solution, (e.g., TOC, etc.):**  
This subclass is indented under subclass 145. Subject matter, in which the carbon content of a aqueous solution is determined.
- 147 MEASUREMENT INCLUDES TEMPERATURE CHANGE OF THE MATERIAL BEING ANALYZED (E.G., CALORIMETRY, ETC.):**  
This subclass is indented under the class definition. Subject matter wherein temperature changes occurring when a material to be analyzed is chemically reacted are utilized as the basis for qualitative or quantitative chemical analysis.
- (1) Note. This subclass provides for processes of calorimetry wherein the heat of reaction of a material is used to qualitatively or quantitatively identify a material, mere determination of heat of formation of a known compound is provided for in Class 73, Measuring and Testing.
- (2) Note. In general the calorimetry found in this Class 436 will involve the chemical combination of a chemical constituent with another to determine the amount or identity of one reactant.
- (3) Note. Although burning a combustible material is technically a chemical reaction, it has not for purposes of classification been considered "chemical". Thus, a process of combustion followed by analysis of the results may be found in Classes 73, 250, 324, and 356 on the basis of the analysis technique.
- (4) Note. The determination of amount of a chemical species is presumptively a chemical analysis in the absence of a showing that the materials are identified by physical tests alone.
- (5) Note. This subclass does not provide for a process wherein the temperature sensor or a portion thereof reacts with the material to be analyzed, such as a process wherein the properties of a conductor or semiconductor are chemically altered in an analysis with a corresponding change in electrical properties.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
151+, for a process of chemical analysis utilizing a catalyst coated temperature responsive electric element and the search notes thereunder.
- SEE OR SEARCH CLASS:  
73, Measuring and Testing, subclasses 25.01+ for a method of gas analysis by electrical thermal determination.  
356, Optics: Measuring and Testing, subclasses 311+ for methods which include heating, burning or otherwise stimulating a sample to cause emission of radiation for optical analysis



- including burning, resistance heating, flame and high frequency fields.
- 374, Thermal Measuring and Testing, subclasses 31+ for processes for calorimetrically determining the amount of a constituent in a compound or the heat of chemical combination where such process involve no more than a determination of the heat evolved by combustion of the material under test.
- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclass 51 for apparatus for carrying out the process of this subclass.
- 148 MEASUREMENT INCLUDES CHANGE IN VOLUME OR PRESSURE:**  
This subclass is indented under the class definition. Subject matter wherein the basis of analysis is a change in volume or pressure caused by chemical reaction.
- 149 MEASUREMENT OF ELECTRICAL OR MAGNETIC PROPERTY OR THERMAL CONDUCTIVITY:**  
This subclass is indented under the class definition. Subject matter wherein electrical, or magnetic properties or thermal conductivity.
- (1) Note. This subclass does not provide for mere use of a thermocouple to detect a temperature change, such tests being classified in this class, subclass 147.
- (2) Note. Thermal conductivity is a physical property and classification in this subclass requires the combination thereof with a chemical reaction.
- SEE OR SEARCH CLASS:**
- 73, Measuring and Testing, subclasses 25.01+ for a method of gas analysis by electrical thermal determination.
- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 775+ for electrolytic analysis or testing processes.
- 324, Electricity: Measuring and Testing, subclasses 425+ and 71.1+ for processes for the determination of non-electric properties by measuring electric properties particularly sub-
- class 71.5 for the use of a semiconductor which is of itself chemically reactive.
- 150 Of a liquid:**  
This subclass is indented under subclass 149. Subject matter wherein an electric or magnetic property of a liquid is determined.
- 151 By means of a solid body in contact with a fluid:**  
This subclass is indented under subclass 149. Subject matter wherein the changes in an electric or magnetic property of a solid in physical contact with the fluid to be determined provides the basis for analysis.
- (1) Note. Physical contact includes chemical reaction with a material as well as mere adsorption.
- (2) Note. Solid body includes a confined mass of particles whose electric or magnetic properties are determined as well as a structural device.
- (3) Note. Thermal conductivity measurement is classified in 149 since the measurement is not based on chemical reaction or absorption with the solid but upon the cooling effect of the fluid on the solid element.
- SEE OR SEARCH CLASS:**
- 73, Measuring and Testing, subclasses 19.01+ and 23.2+ for physical methods of gas analysis, especially subclasses 23.35+ for chromatographic analysis.
- 204, Chemistry: Electrical and Wave Energy, appropriate subclasses for electrical wave energy processes and apparatus. See the References to Other Classes section of the Class 204 definition for an explanation of the class line between Class 436 and Class 204.
- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 775+ for electrolytic analysis or testing processes.

- 340, Communications: Electrical, sub-classes 632+ for electrical indicating or measuring systems which include the use of a semiconductor gas detector.

**152 Solid body contains a combustion catalyst:**

This subclass is indented under subclass 151. Subject matter wherein the material to be analyzed undergoes combustion in contact with a catalyst containing temperature-responsive element whose change in electrical property is a basis for the analysis.

- (1) Note. Mere recital of a catalyst without combustion being indicated goes in subclass 151.

**153 Of an ionized gas:**

This subclass is indented under subclass 149. Subject matter wherein an electric or magnetic property of an ionized gas is measured as a step in analysis.

- (1) Note. The gas may be the result of heating a liquid sample.
- (2) Note. Wave or particle radiation as well as use of electric discharge to ionize the gas is included herein.

**SEE OR SEARCH CLASS:**

- 356, Optics: Measuring and Testing, sub-classes 311+ for methods which include heating, burning or otherwise stimulating a sample to cause emission of radiation for optical analysis including burning, resistance heating, arc heating, flame and high frequency fields.

**154 Flame ionization:**

This subclass is indented under subclass 153. Subject matter wherein basis for analysis is the change in conductivity of a standard flame by inclusion therein of a gaseous material to be analyzed.

- (1) Note. The standard flame is usually hydrogen.

**SEE OR SEARCH CLASS:**

- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclass 54 for apparatus for carrying out the process of this subclass.

**155 PYROLYSIS, COMBUSTION, OR ELEVATED TEMPERATURE CONVERSION:**

This subclass is indented under the class definition. Subject matter wherein the material to be analyzed is (1) heated either in the presence or absence of oxygen to cause a chemical reaction or (2) thermally decomposed.

- (1) Note. Elevated temperature conversion is construed to be more than mere heating to increase or optimize reaction rate, e.g., the conversion will not occur unless performed at an elevated temperature.
- (2) Note. On combustion in general: a process of combustion is not considered to be a chemical reaction, however, a quantitative reaction with oxygen or an oxygen containing gas in a test for a chemical specie is taken to be more than mere combustion and is considered to be a chemical test.
- (3) Note. This subclass will provide for methods of sample preparation by combustion or pyrolysis.

**SEE OR SEARCH CLASS:**

- 356, Optics: Measuring and Testing, sub-classes 311+ for methods which include heating burning or otherwise stimulating a sample to cause emission of radiation of optical analysis including burning, resistance heating, arc heating, flame and high frequency fields.

**156 Explosibility:**

This subclass is indented under subclass 155. Subject matter wherein the susceptibility to explosive detonation of a material is utilized to make a qualitative or quantitative determination.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

141, for octane and gasoline tests.

SEE OR SEARCH CLASS:

73, Measuring and Testing, subclasses 35.01+ for a process of testing explosive or motor fuels to measure or test detonation or knock characteristics; subclass 36 for testing illuminating fluids to determine flash point; and subclass 167 for methods of testing ordinance or projectiles.

149, Explosive and Thermic Compositions or Charges, subclass 109.6 for processes of making explosive charges.

**157 Multiple stages of heating or heating at multiple temperatures or application of temperature gradient:**

This subclass is indented under subclass 155. Subject matter wherein the material is subjected to plural heating temperatures in one or more zones or to a varying temperature in a single zone.

(1) Note. Preheating of the material is construed to be a stage of heating and is the subject matter of this subclass.

(2) Note. Heating that is continuously varied, e.g., a temperature gradient, would be classified here.

**158 Dividing or separating a sample stream:**

This subclass is indented under subclass 157. Subject matter a sample stream is divided into portions.

(1) Note. The sample stream may be divided before or after pyrolysis, combustion or high temperature conversion.

(2) Note. The division or separation may be volumetric or dependent upon composition e.g., chromatography, cold trap, etc.

**159 With catalyst or accelerator:**

This subclass is indented under subclass 155. Subject matter wherein the pyrolysis, combustion or high temperature conversion is effected in the presence of a catalyst or accelerator.

**160 Combustion with oxygen containing gas:**

This subclass is indented under subclass 155. Processes wherein the material to analyzed is subjected to combustion in the presence of an oxygen containing gas.

(1) Note. Combustion with pure oxygen is included herein.

**161 INCLUDING CHROMATOGRAPHY:**

This subclass is indented under the class definition. Processes and compositions in which the result of a chemical reaction is subjected to chromatographic separation or analysis is carried out by chromatography using a chromophore.

SEE OR SEARCH CLASS:

73, Measuring and Testing, subclasses 61.62+ for methods of liquid chromatography which do not involve a chemical reaction; subclasses 54.01+ for viscosity measuring methods; subclasses 64.45+ for measurement of vapor pressure; subclasses 64.47+ for measurement of osmotic pressure; subclasses 64.48+ for measurement of surface tension.

95, Gas Separation: Processes, subclasses 82+ for processes of gas separation using chromatography.

210, Liquid Purification or Separation, subclass 656 for chromatography columns for generic fluids or liquids when there is no analysis of the displaced liquid.

356, Optics: Measuring and Testing, subclasses 409+ for a process including liquid or gas chromatography wherein a fluid substance, a solute in a solvent, or a miscible liquid is examined by a transmissive light test to furnish quantitative or qualitative determination with respect to chemical composition of the material analyzed in the absence of a color development reaction.

422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclasses 50+ for analytical apparatus involving chromatography or a colorimeter wherein a

reactive reagent is used to develop color.

**162 Utilizing paper or thin layer plate:**

This subclass is indented under subclass 161. Processes or compositions in which the sorbent comprises a fibrous web or a thin coating of sorptive material or a flat substrate and wherein separation occurs along the plane of the web or coating.

**SEE OR SEARCH CLASS:**

210, Liquid Purification or Separation, subclass 658 for a process of paper or thin layer chromatography without the use of a chromophore to separate a material into its constituents.

**163 INCLUDING TITRATION OR pH DETERMINATION:**

This subclass is indented under the class definition. Subject matter wherein the combining capacity of a substance with a reagent is measured or the hydrogen ion concentration is determined.

**SEE OR SEARCH CLASS:**

73, Measuring and Testing, subclasses 19.01+ and 23.2+ for physical methods of gas analysis, especially subclasses 23.35+ for chromatographic analysis.

204, Chemistry: Electrical and Wave Energy, subclasses 400+ for electrolytic analysis and testing apparatus, especially subclass 433 for electrolytic apparatus used to measure carbon or pH.

205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 775+ for electrolytic analysis or testing processes, especially subclass 787.5 for analysis or testing to determine pH by electrolysis and subclass 788.5 for electrolytic analysis or testing involving titration.

324, Electricity: Measuring and Testing, subclass 438 for a process which uses an electrical device to determine the hydrogen ion concentration absent any step involving a chemical reaction.

600, Surgery, subclass 309 for a method of measuring pH of a body fluid on, or in the living body.

**164 OPTICAL RESULT:**

This subclass is indented under the class definition. Subject matter wherein the basis for analysis is an optical result of a chemical reaction that is measured mechanically or visually, e.g., photometer, colorimeter, by human sight, etc.

(1) Note. On disposition of optical examination techniques: See the Search Class notes below for the lines between optical areas.

**SEE OR SEARCH CLASS:**

33, Geometrical Instruments, for mechanical scales and gauges which may be part of optical measuring systems.

73, Measuring and Testing, subclasses 23.35+ and 61.52+ for methods and apparatus for examining the band or bands of the chromatography column to determine the quantity, quality, or the substances of the band or bands in a gas or liquid chromatography test.

(a) Class 73 provides for measuring and testing which may include optical measuring and testing, combined with some nonoptical limitation beyond the scope of Class 356, Optics: Measuring and Testing and specifically provided for in Class 73. Specific provision exists in Class 73 when the measurement or test is of the type provided for by the subclasses of Class 73. For example, Class 73, subclasses 23.35+ provides for gas chromatography involving color determination of the Class 356 type together with some manipulation of the gas beyond the scope of Class 356. Again Class 73 subclasses 116+ provides for engine testing involving optical tests of the Class 356 type together with some mechanical manipulation of the parts beyond the scope of Class 356. In general Class 73 provides for measuring and testing of the type

- indicated by its subclass titles and definitions which may include optical steps together with other mechanical measuring and testing steps beyond the scope of Class 356. There are some patents presently in Class 73 which relate to measuring and testing as there provided, but which claim only optical subject matter within the scope of Class 356. Combinations of optical measuring or testing with other structure or methods is classified in Class 356 if no provision for such combination exists elsewhere.
- 95, Gas Separation: Processes, subclasses 82+ for processes of gas separation using chromatography in which no analysis is made of the colored band or successive bands of the chromatography test.
- 116, Signals and Indicators, subclasses 200+ provides for mechanical indicators which may be part of optical measuring systems.
- 210, Liquid Purification or Separation, for chromatography columns for generic fluids or liquids when there is no analysis of the electrolyte or displaced liquid.
- 250, Radiant Energy, subclasses 200+ for photocell circuits and apparatus.
- 313, Electric Lamp and Discharge Devices, subclasses 523+ provides for photo-sensitive discharge devices.
- 324, Electricity: Measuring and Testing, for electrical indicating and measuring devices which may be part of optical measuring systems.
- 340, Communications: Electrical, for electrical indicating and measuring devices which may be part of optical measuring systems.
- 356, Optics: Measuring and Testing, see the search note to Class 73 in this section.
- 359, Optics: Systems, for optical elements which may be used in measuring and testing apparatus. The conventional optical element such as lenses, prisms and mirrors are there. subclasses 436+ relating to scale or indicia reading should be particularly noted.
- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclasses 50+ for analytical apparatus involving chromatography or a colorimeter wherein a reactive reagent is used to develop color.
- 165 With claimed manipulation of container to effect reaction or use of container of claimed optical structure:**  
This subclass is indented under subclass 164. Subject matter wherein the chemical reaction takes place in a container that is claimed as manipulated in some manner to effect the reaction or is claimed as constructed so as to facilitate optical examination.
- (1) Note. The manipulation is usually to improve or enhance the reading of the optical result.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 43+, for chemical testing by automated analysis which may include optical examination.
- SEE OR SEARCH CLASS:
- 356, Optics: Measuring and Testing, subclass 246 for fluid containers, e.g., cells or cuvettes, not claimed as part of a chemical analysis process.
- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclass 58 for apparatus for carrying out the process of this subclass.
- 166 Including reagent preparation:**  
This subclass is indented under subclass 164. Subject matter including a step of preparing a reagent to be utilized in the chemical reaction to be optically analyzed.
- (1) Note. Preparation includes a specifically recited step of reagent manipulation or transfer, or reagent production for an immediate use (in situ generation) of subsequent analysis.

- (2) Note. For purposes of cross-referencing reagent preparation by electrolytic action should be placed here.

**167 Including gas absorption in liquid or solid:**

This subclass is indented under subclass 164. Subject matter including absorption or adsorption of gaseous materials by a liquid or solid media which is in turn optically examined.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 161, wherein chromatography is utilized as a step in an analysis without the requirement that the basis for analysis be an optical result in the liquid or solid media. Also note the search class notes to Class 95, Gas Separation: Processes, therein.

SEE OR SEARCH CLASS:

- 95, Gas Separation: Processes, subclasses 90+ for processes of gas separation using solid sorption, per se, and subclasses 149+ for processes of gas separation using liquid contacting, per se.

**168 Liquid sorbent:**

This subclass is indented under subclass 167. Subject matter wherein the gaseous material to be analyzed flows into a liquid resulting in an optically detected reaction.

**169 With reagent in absorbent or bibulous substrate:**

This subclass is indented under subclass 164. Subject matter wherein the material to be analyzed is reacted with a reagent contained in absorbent or bibulous carrier or substrate.

- (1) Note. Included herein are a dip-stick, test paper, wick, etc.
- (2) Note. This subclass is not intended to be a catch-all for test substrates. Cross-referencing is not mandatory in this subclass when claims are classifiable in subclasses 1 to 146 and merely perform the test on an impregnated substance.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 166, for processes of optical detection including reagent preparation.

SEE OR SEARCH CLASS:

- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclass 56 for equivalent apparatus.

**170 Plural superposed layers:**

This subclass is indented under subclass 169. Processes wherein the absorbent or bibulous carrier or substrate includes plural superposed layers, and wherein the material to be analyzed flows between at least two layers.

- (1) Note. Mere support of an absorbent or bibulous carrier or substrate on a support is not included in this subclass.

SEE OR SEARCH CLASS:

- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclass 60 for apparatus for carrying out the process of this subclass.

**171 Spectrum analysis (e.g., flame photometry, etc.):**

This subclass is indented under subclass 164. Processes wherein the basis of chemical analysis is spectral lines or bands.

SEE OR SEARCH CLASS:

- 356, Optics: Measuring and Testing, subclasses 303+ and 311+ for heating or combination of a sample and the spectrographic analysis of the heated sample.
- 702, Data Processing: Measuring, Calibrating, or Testing, subclasses 22+ for chemical analysis data processing, particularly subclasses 27+ for molecular structure or composition determination.

**172 With fluorescence or luminescence:**

This subclass is indented under subclass 164. Processes wherein the material to be analyzed is excited whereby it emits light, or causes a change in wavelength of the incident light, or

produces light during a chemical reaction without apparent temperature rise.

**SEE OR SEARCH CLASS:**

- 250, Radiant Energy, subclass 361 for a process involving chemiluminescent detection which involves electrical signaling.
- 252, Compositions, subclass 700 for chemiluminescent compositions, 625+ for radioactive compositions, subclasses 301.16+, 301.36, and 301.4 for luminescent compositions particularly 301.17 for scintillating or lasing compositions.
- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclass 52 for apparatus for carrying out the process of this subclass.

**173 Nuclear magnetic resonance, electron spin resonance, or other spin effects or mass spectrometry:**

This subclass is indented under the class definition. Processes including the use of nuclear magnetic resonance, electron paramagnetic resonance or other spin effects and mass spectrometry.

- (1) Note. Recitation of the specific chemical formula of a compound utilized for spin labeling, as a shift reagent or as a solvent in a process claim is considered to be "significant chemistry" classifiable here as compared to Class 324.

**SEE OR SEARCH CLASS:**

- 73, Measuring and Testing, subclasses 23.35+ for the combination of a gas chromatograph and a nominally recited mass spectrometer.
- 250, Radiant Energy, subclasses 281+ for processes which include use of a mass spectrometer or calutron or a method of separating or accumulating ions based upon the charge to mass ratio.

**174 INCLUDING SAMPLE PREPARATION:**

This subclass is indented under the class definition. Processes including treatment of the material to be analyzed to facilitate subsequent analysis.

- (1) Note. This subclass provides for documents which claim subcombinations of chemical tests which are not provided for in a chemical, electrical, or optical class. There may be only nominal claim language to chemical analysis.

**SEE OR SEARCH CLASS:**

- 73, Measuring and Testing, for a sampling process which is not claimed or solely disclosed as part of a process of chemical analysis and the search notes therein for other classes providing for sampling techniques.

**175 Digestion or removing interfering materials:**

This subclass is indented under subclass 174. Processes wherein the material to be analyzed is subjected to a step of disintegration by a chemical reagent or in which a substance which interferes with subsequent analysis is removed.

- (1) Note. The interference may be chemical or physical (i.e., entrapment in a matrix, etc.).

**176 Stabilizing or preserving:**

This subclass is indented under subclass 174. Subject matter wherein the material to be analyzed is stabilized or preserved prior to analysis.

- (1) Note. This subclass includes methods for prevention of changes in a sample during its transportation and storage.
- (2) Note. Stability Tests are generally classified on the basis of the species tested for.

**SEE OR SEARCH CLASS:**

- 252, Compositions, subclass 380 for preservative compositions especially subclass 397 for a chemical change inhibitor.
- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclasses 1+ for a process of preserving not claimed in combination with chemical analysis.

**177 Liberation or purification of sample or separation of material from a sample (e.g., filtering, centrifuging, etc.):**

This subclass is indented under subclass 174. Processes in which the sample to be subjected to chemical analysis is the product of an isolation or purification procedure.

- (1) Note. Included herein are procedures involving filtering, centrifuging, sorption, as well as concentrating evaporation and chromatography.

**SEE OR SEARCH CLASS:**

- 34, Drying and Gas or Vapor Contact With Solids, provides for processes of separating liquids from solids or slurries, i.e., drying as well as the contact of solids with either, or both, gases and vapors. If the starting material is in the form of a liquid suspension or solution even if the process is continued to the point of complete dryness, Class 159, Concentrating Evaporators, will take the process.
- 62, Refrigeration, includes processes which include removing heat by refrigeration from a substance whether solid, liquid, or vapor. In particular, Class 62, subclasses 8+ will take processes of making a solidified or liquefied gaseous product provided the gas has a normal boiling point below 32 (methane, ethane, propane) and Class 62, subclasses 500+ will take processes wherein a solution or mixture is cooled to solidify a constituent which is then removed from the mixture.
- 95, Gas Separation: Processes, for physical processes involving steps resulting in separation of a gas from a fluid mixture comprising (a) a gas and solid or liquid particles entrained therein, (b) a liquid and gas entrained therein, or (c) a plurality of gases.
- 159, Concentrating Evaporators, provides for processes peculiar to the concentration of solids held in solution or suspension by evaporation of the liquid containing them and the recovery of the concentrate. If the starting material is a solid or slurry placement

in Class 34, Drying and Gas or Vapor Contact With Solids, would be indicated. Class 159 will take concentration to the point of crystallization or to dryness, however, removal of water of crystallization is considered to be a chemical reaction and placement would not be proper in Class 159. Evaporating with subsequent vapor condensation is excluded from Class 159 and in such case, placement in Class 203, Distillation: Processes, Separatory, would be proper.

201, Distillation: Processes, Thermolytic, provides for processes of thermolytic distillation wherein a solid carbonaceous material is heated to vaporize a volatile portion and to cause chemical decomposition of the heated material to form different chemical substances at least some of which are volatile and leave behind a solid carbonaceous material.

203, Distillation: Processes, Separatory, provides for processes for separating a liquid mixture by vaporizing and condensing a portion thereof to isolate in the condensed liquid or the unvaporized portion a relatively pure compound which was present in the original mixture. The original mixture may be in a solid form so long as it melts to form a liquid before it vaporizes. A solid original mixture which undergoes chemical decomposition leaving a carbonaceous residue would be classifiable in Class 201, Distillation: Processes, Thermolytic, which is superior to Class 203. Processes including a chemical reaction and a separatory distillation operation are classified in Class 203 only when the chemical reaction merely facilitates the isolation by the separatory distillation operation of a pre-existing substance in the distilland. See Class 260, Chemistry of Carbon Compounds, or Class 423, Chemistry of Inorganic Compounds, for a process of preparing a compound and isolating it by a separatory distillation process.



210, Liquid Purification or Separation, includes processes for the separation or purification of a constituent from a flowable liquid mixture by dialysis, sorption, ion exchange liquid extraction, gravitational separation, or filtration, as well as purification of a liquid mixture by destruction or conversion of a constituent. Processes directed to the purification of a particular compound or composition (including solution of either the compound or composition in water), are classified with the particular compound or composition. Insofar as the treatment of liquids with ion exchange or sorption materials are concerned, the following lines will be maintained. (1) Where water is the only disclosed liquid purified, the patent will be classified in this class (210). (2) Where disclosure includes water, hydrocarbons and/or other liquids the patent will be classified: (a) In Class 210 if all claims are broad as to the liquid. (b) In Class 210 if several species of liquid are claimed and one species includes water. (c) In the appropriate art class if some liquid other than water is the only liquid claimed (e.g., mineral oils, organic compounds). (3) Purification or separation of liquids by flocculation only are classified in Class 210. (4) Processes wherein all claims are limited to the deposition of specific materials on ion-exchangers or sorbents with subsequent recovery of the specific materials are classified with material so operated upon. Class 210 is superior to Class 95 and takes separating processes, per se, generally disclosed or claimed as fluid separation, or if the disclosure or a claim is restricted to liquid separation.

260, Chemistry of Carbon Compounds, provides for the liberation and purification by chemical or physical means of compounds and extracts falling within the class definition of Class 260. Generally the physical processes included are of two types (a) a purification process prior or subsequent to a chemical reaction producing a Class 260 product, (b) a purification process

directed to the purification of a Class 260 compound by a combination of physical separation techniques the classes for which do not provide for or exclude the combination claimed. Chemical purification processes are generally provided for with each product produced.

422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclass 101 for apparatus for carrying out the process of this subclass.

435, Chemistry: Molecular Biology and Microbiology, subclasses 262+ for methods of using microorganism or enzyme to liberate or purify a preexisting substance.

**178 Including use of a solid sorbent, semipermeable membrane, or liquid extraction:**

This subclass is indented under subclass 177. Processes wherein the material to be analyzed is concentrated or separated by sorption, ion entrapment, a septum selective as to material or by liquid extraction.

**SEE OR SEARCH CLASS:**

210, Liquid Purification or Separation, subclasses 656+ for a process of chromatographic separation using a solid sorbent and subclass 635 for processes using a liquid or organic gel as a sorbent.

**179 Dilution:**

This subclass is indented under subclass 174. Processes wherein the material to be analyzed is diluted prior to analysis.

**180 Volumetric liquid transfer:**

This subclass is indented under subclass 174. Processes wherein the material to be analyzed is a liquid and including a step of obtaining and transferring an absolute volume or a predetermined volumetric ratio to the source of the material to be analyzed.

**SEE OR SEARCH CLASS:**

422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclass 100 for apparatus for carrying out the process of this subclass.

- 181 Gaseous sample or with change of physical state:**  
This subclass is indented under subclass 174. Processes including step of sampling a vaporous or gaseous material to be analyzed, or changing the physical state of a sample.
- (1) Note. This subclass will provide for a process in which the gaseous sample is produced by vaporization of a liquid.
  - (2) Note. A change of physical state includes melting and solidification.
- 182 ELEMENT OR INORGANIC COMPOUND:**  
This subclass is indented under the class definition. Processes or composition which are directed to the chemical analysis of an element or inorganic compound not provided for above.
- 183 MISCELLANEOUS:**  
This subclass is indented under the class definition. Processes or compositions which are not other wise provided for.
- (1) Note. This subclass would provide for processes for determining properties such as toxic effects of substances by a chemical test.
- 500 THYROID HORMONE TESTS (E.G., T<sub>3</sub>, T<sub>4</sub>, TBG, TSH, ETC.):**  
This subclass is indented under the class definition. Subject matter for hormones associated with or acting on the thyroid gland or binding proteins associated with such hormones.
- (1) Note. Included are triiodothyronine (T<sub>3</sub>) thyroxine (T<sub>4</sub>), thyroid binding globulin (TBG), thyroid stimulating hormone (TSH), etc. Also included are thyroxine binding index tests and test for "free" (unassociated with binding proteins) hormones.
- 501 BIOSPECIFIC LIGAND BINDING ASSAY:**  
This subclass is indented under the class definition. Subject matter in which there is an interaction between a material and a receptor which by claim or disclosure is specific to class of compounds or a single compound.
- (1) Note. The receptor material typically is isolated from a cellular material from a living body such as a membrane or organ and exhibits great specificity to the specie to be tested for.
  - (2) Note. Examples of the type of materials included herein are tests involving cardiolipin, opiate receptor material, Beta-endorphin, and B protein (Bucorvaz protein). Also included are agglutination tests.
- 503 Utilizing isolate of tissue or organ as binding agent:**  
This subclass is indented under subclass 501. Subject matter wherein the receptor is a tissue or an isolate of a tissue or organ.
- (1) Note. Tests involving sensitized lymphocytes are included in this subclass.
- 504 Radioactive label:**  
This subclass is indented under subclass 503. Methods in which a radioactive label is employed as an aid in detection.
- SEE OR SEARCH CLASS:  
600, Surgery, subclasses 300+ for methods of diagnostic testing on or in the living body.
- 505 B12 or Folate:**  
This subclass is indented under subclass 504. Methods in which the substance tested for is vitamin B12 or a folate.
- 506 FOR PREEXISTING IMMUNE COMPLEX OR AUTO-IMMUNE DISEASE:**  
This subclass is indented under the class definition. Subject matter involving immunoassay for antigens, antibodies or immune complexes associated with autoimmune disease.
- (1) Note. This subclass includes immunohistopathology testing.
  - (2) Note. Autoimmune disease includes: (a) Systemic Rheumatic diseases [(1) Systemic lupus erythematosus; (2) Progressive systemics clerosia; (3) Chronic

- discoid lupus; (4) Mixed connective tissue disease (MCTD)] (b) Rheumatoid Arthritis; (c) Kidney diseases resulting from reaction of antibodies with renal basement membrane, or the formation of circulating immune complex glomerulonephritis; (d) Hashimoto's disease (chronic thyroiditis); (e) Diseases involving antibodies to tissue specific antigens [1. Mitochondrial antigens (antibodies found in primary biliary cirrhosis). 2. Smooth muscle antigens, i.e., antibodies which may be demonstrated in some infectious disease such as viral hepatitis, yellow fever and infectious mononucleosis and in some malignancies such as carcinoma of the ovary and malignant melanoma and in some types of cirrhosis. 3. Gastric Parietal Cells - antibodies to intracytoplasmic antigens of gastric parietal cells, to the B12 binding site of intrinsic factor and to the intrinsic factor B12 complex may be found in patients with pernicious anemia.] (f) Skin Diseases [1. Vesiculobullous skin diseases-pemphigus, pemphigoids, dermatitis herpetiformis, herpes gestationis; 2. Cutaneous forms of lupus erythematosus vasculitis (rheumatoid vasculitis)] (g) Human sperm antibodies.
- 507 Immune complex:**  
This subclass is indented under subclass 506. Subject matter which includes a test for the antigen-antibody complex itself.
- (1) Note. This subclass includes tests employing as reagents Rheumatoid factors and complements.
- 508 Antinuclear (e.g., DNA, etc.):**  
This subclass is indented under subclass 506. Subject matter, including tests for antibodies to antigens which form part of the material of a cell nucleus.
- (1) Note. This subclass includes tests in which the antigen is DNA.
- (2) Note. Tests for lupus erythematosus and rheumatoid arthritis are included here.
- 509 Rheumatoid factors:**  
This subclass is indented under subclass 506. Subject matter which includes tests for immunoglobulins found in patients with rheumatoid arthritis.
- 510 IMMUNOCHEMICAL PREGNANCY DETERMINATION:**  
This subclass is indented under the class definition. Subject matter including immunoassay testing for pregnancy.
- 512 INVOLVING ANTIBODY FRAGMENTS:**  
This subclass is indented under the class definition. Subject matter which involves an immunoassay which utilizes only a subpart of an antibody.
- 513 INVOLVING IgA, IgD, IgE, or IgM:**  
This subclass is indented under the class definition. Subject matter which involves tests for immunoglobulins other than IgG.
- (1) Note. This subclass provides for methods of allergen detection (IgE).
- 514 INVOLVING DIFFUSION OR MIGRATION OF ANTIGEN OR ANTIBODY:**  
This subclass is indented under the class definition. Subject matter in which the antigen or antibody migrates through a solid or semisolid medium to produce lines or bands of precipitation.
- 515 Through a gel (e.g., Ouchterlony technique, etc.):**  
This subclass is indented under subclass 514. Subject matter in which migration of the antigen or antibody is through a gel.
- (1) Note. Included herein is the use of agar or gelatin in tubes or on plates.
- SEE OR SEARCH CLASS:**  
204, Chemistry: Electrical and Wave Energy, subclasses 456+ for gel electrophoresis, in general.  
516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous

liquid phase (gels, pastes, flocs, coagulates) or agents for such systems or making or stabilizing such systems or agents, when generically claimed or there is no art class. Class 516 provides for compositions otherwise seemingly proper for Class 436 when the compositions are colloid systems or wetting agents.

**516 Immunoelectrophoresis:**

This subclass is indented under subclass 515. Subject matter in which antigens or antibodies migrate through a gel medium under the influence of an electric current.

**SEE OR SEARCH CLASS:**

204, Chemistry: Electrical and Wave Energy, subclasses 456+ for gel electrophoresis of proteins other than antibodies.

**517 INVOLVING KINETIC MEASUREMENT OF ANTIGEN-ANTIBODY REACTION:**

This subclass is indented under the class definition. Subject matter in which the time rate of progress of an antigen-antibody interaction is measured.

**518 INVOLVING AN INSOLUBLE CARRIER FOR IMMOBILIZING IMMUNOCHEMICALS:**

This subclass is indented under the class definition. Subject matter in which an immunological test is carried out using an antigen, antibody or fragment thereof as part of an artificially produced composition or complex or compound which imparts the property of physical confinement or localization during an immunochemical analysis and the processes for preparing the same.

**SEE OR SEARCH CLASS:**

65, Glass Manufacturing, for processes of making glass articles, particularly subclasses 447+ for making a resin coated glass fiber; and subclass 22 for making a porous glass article which may find utility as an immobilization agent.

106, Compositions: Coating or Plastic, for protein containing coating or plastic compositions, particularly subclass 4, 31.24, 31.53, 31.82, 31.94, 38.4,

124+, 614, 645, and indented subclasses.

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 77+ for pore forming in combination with a laminating step.

210, Liquid Purification or Separation, subclass 660 and 263+ for processes and apparatus for ion exchange or sorption of components from a liquid; and subclass 615 for a process of use of a immobilized enzyme or microorganism to purify sewage.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 41+ for significant molding processes which include the step of pore forming in situ.

424, Drug, Bio-Affecting and Body Treating Compositions, especially subclasses 400+ for coated products which may contain a protein; subclasses 94.1+ for a composition containing an enzyme or coenzyme including immobilized forms.

426, Food or Edible Material: Processes, Compositions, and Products, appropriate subclasses for edible protein compositions or products and related process involving the same.

428, Stock Material or Miscellaneous Articles, subclasses 411.1+ for a non-structural stock material product in the form of a composite web or sheet including a layer comprising protein, and other appropriately titled subclasses, e.g., subclasses 435 and 458; and subclasses 304.4+ for a stock material in the form of a composite web or sheet embodying a component which is porous or cellular.

435, Chemistry: Molecular Biology and Microbiology, subclasses 174+ for carrier bound or immobilized enzymes or microbial cells and the preparation thereof and subclass 188 for enzyme conjugates, ligands and adducts.

514, Drug, Bio-Affecting and Body Treating Compositions, subclasses 2+ for a composition containing a protein.

521, Synthetic Resins or Natural Rubbers, subclasses 25+ for an ion exchange resin and the processes of making or

regenerating them; and subclasses 50+ for cellular, or porous resinous bodies and the process of preparing them.

525, Synthetic Resins or Natural Rubbers, subclasses 54.1+ for a product or process of chemically reacting a protein or polypeptide with a synthetic resin.

530, Chemistry: Natural Resins or Derivatives; Peptides or Proteins; Lignins or Reaction Products Thereof, subclasses 300 through 345 for peptides and reaction products thereof; subclasses 350 to 427 for proteins and the reaction products thereof; and cross-reference art collections 800 through 859 for antigenic peptides or proteins, methods of immobilizing peptides or proteins, and the source materials from which peptides or proteins are isolated.

- (1) Note. Immobilization results from covalent bonding between an immunochemical and the carrier or an ionic bonding between an immunochemical and a carrier or sorption of an immunochemical within a carrier, or entrapment of an immunochemical within a carrier.
- (2) Note. A carrier material may be either water soluble or water insoluble.
- (3) Note. Reaction or ultra filtration cells, vials, or beakers which contain immunochemicals are not considered to be immobilized complexes or compositions.
- (4) Note. Antigens chemically or physically bonded to a water insoluble matrix, antibodies contained within a polymer or gel, antigens absorbed on a resin are examples of immobilized immunochemicals.
- (5) Note. Haptens are considered to be antigens for the purpose of this subclass.

(6) Note. When a carrier is composed of more than one material, the patent is placed into the subclass which corresponds to the material to which the Ag or Ab is bound, e.g., a carrier which is a synthetic polymer-coated metal is placed in subclass 525.

(7) Note. The carrier material or the carrier material and a covalent bond forming agent impart to the immunochemical the property of physical confinement or localization during a continuous process or the property of enhanced recoverability in a batch process which it did not possess prior to treatment with the carrier material or carrier material and a covalent bonding agent.

#### 519

##### **Carrier is a biological cell or cell fragment:**

This subclass is indented under subclass 518. Subject matter in which the carrier is a biological cell or fragment thereof.

- (1) Note. Biological cells or fragments thereof include bacteria and blood cells.
- (2) Note. This subclass includes the use of a bacteria as a carrier or the use of a cell wall fragment as a carrier.

#### 520

##### **Red blood cell:**

This subclass is indented under subclass 519. Subject matter in which the carrier is a red blood cell.

- (1) Note. Included herein are treated red blood cells and fragments of red blood cells including stroma carrying heterophile antigens or various antigenic materials including antibodies.
- (2) Note. This subclass excludes Rh membrane antigens and immunohematological testing which is provided for in Class 435, subclasses 7.1+.

**521 Fixation or stabilization of red blood cells:**

This subclass is indented under subclass 520. Subject matter which includes the chemical or physical treatment of the red blood cells to prevent deterioration.

- (1) Note. This subclass includes cells treated with agents which act as both preservatives and bonding agents such as glutaraldehyde, formaldehyde cyanuric chloride, etc.

**522 Lysis of red blood cell membrane:**

This subclass is indented under subclass 520. Subject matter in which there is a step of lysis of the red blood cells.

**SEE OR SEARCH CLASS:**

435, Chemistry: Molecular Biology and Microbiology, subclass 269 for a process of lysis by microorganism or enzyme.

**523 Carrier is particulate and the particles are of intentionally different sizes or impregnated differently with the immunochemicals:**

This subclass is indented under subclass 518. Subject matter in which the carrier is particulate and the particles are formed or chosen to be different sizes or are coated with chemically different coating materials.

**524 Carrier is inorganic:**

This subclass is indented under subclass 518. Subject matter in which the carrier is an inorganic compound or metal or alloy.

- (1) Note. The term “minerals” is presumed to refer to inorganic minerals although care should be taken with disclosure to coal or other carbonaceous minerals which are for purpose of this subclass are to be considered inorganic.

**525 Metal or metal coated:**

This subclass is indented under subclass 524. Subject matter in which the carrier is a metal.

**526 Magnetic:**

This subclass is indented under subclass 525. Subject matter in which the carrier is magnetic.

- (1) Note. The essential characteristic of the patents in this subclass is that the processes claim or disclose use of a magnetic separation step.

**527 Glass or silica:**

This subclass is indented under subclass 524. Subject matter in which the carrier is glass or silica.

- (1) Note. The glass may be a plate, hollow tube or test tube.

**528 Carrier is organic:**

This subclass is indented under subclass 518. Subject matter in which the carrier is an organic compound.

- (1) Note. See subclass 133 for a definition of organic.

**529 Polysaccharide carrier (e.g., dextran, etc.):**

This subclass is indented under subclass 528. Subject matter in which the carrier is a polysaccharide.

- (1) Note. This includes subclass materials designated as carbohydrates.
- (2) Note. Derivatized starch, derivatized cellulose, and derivatized polysaccharides are included in this subclass.

**530 Cellulose or derivative:**

This subclass is indented under subclass 529. Subject matter in which the polysaccharide is cellulose or substituted cellulose.

- (1) Note. Exemplary of materials included herein would be DEAE cellulose, etc.

**531 Carrier is synthetic resin:**

This subclass is indented under subclass 528. Subject matter in which the support material is a linear or cross-linked polymer which is not naturally occurring.

- (1) Note. For purposes of this and the indented subclass “latex” is conclusively presumed to be a synthetic resin.
- (2) Note. Polystyrene latex particles make up the majority of the latex subclass.

**532 Antigen or antibody is attached to a carrier via bridging agent:**

This subclass is indented under subclass 531. Subject matter wherein the Ag or Ab is bonded to the polymeric carrier through an intermediate compound which attaches to both the Ag or Ab and the carrier.

- (1) Note. The intermediate compound is not another Ag or Ab. Such interactions are found below in subclass 540.
- (2) Note. The formation of a carrier bound Ag or Ab may be in as stagewise manner with a reaction between the carrier and bridging agent being completed before the Ag or Ab is added or in a process in which the carrier, bridging agent, and Ag or Ab are present simultaneously, in which case some care should be exercised in distinguishing the subject matter of this subclass from mere entrapment. In general, if three separate entities, i.e., Ag or Ab and two different chemical species are present simultaneously bonding through a bridging agent should be presumed.
- (3) Note. A product or process classifiable in this subclass combines a polymeric carrier with a bridging agent to provide functional groups for Ag or Ab attachment. It should be noted that similar functional groups can be provided by prior formation of a polymeric carrier by copolymerization of monomers one or more of which contain the desired functional group for Ag or Ab attachment and that as such would be provided for in 531.

**533 Carrier is water suspendible particles (e.g., latex etc.):**

This subclass is indented under subclass 532. Subject matter in which the carrier consists of colloidal particles of synthetic resin suspended or disclosed as suspended in an aqueous medium.

- (1) Note. The bulk of patents classified herein are directed to polystyrene latex as the carrier.

**SEE OR SEARCH CLASS:**

- 524, Synthetic Resins or Natural Rubbers, in particular subclasses 577+ and 800+ for a process of synthesis of a polystyrene latex.
- 525, Synthetic Resins or Natural Rubbers, subclasses 54.1+ for a process of after treatment of a polystyrene latex.

**534 Carrier is water suspendible particles:**

This subclass is indented under subclass 531. Subject matter in which the carrier consists of colloidal particles of synthetic resin suspended or disclosed as suspended in an aqueous medium.

**535 Antigen or antibody entrapped within the carrier (e.g., gel, hollow fiber, etc.):**

This subclass is indented under subclass 531. Subject matter wherein the Ag or Ab is physically trapped in a reticulated polymer structure or entrapped within a microcapsule.

**536 INVOLVING IMMUNE COMPLEX FORMED IN LIQUID PHASE:**

This subclass is indented under the class definition. Subject matter in which the immune complex is formed in a liquid.

- (1) Note. Cases in which separation methods are disclosed but not claimed are classified here and crossed to the appropriate separation method.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 515, for immune complex formation in gels.

**537 Signal modification or steric inhibition:**

This subclass is indented under subclass 536. Subject matter wherein the formation of the immune complex alters molecular properties giving rise to a detectable change in the tag or label attached to the antigen or antibody.

- (1) Note. Typically the signal modification is fluorescent quenching.

**538 Separation of immune complex from unbound antigen or antibody:**

This subclass is indented under subclass 536. Subject matter in which excess antigen or antibody is separated from the immune complex by physical or chemical means.

**539 Involving precipitating reagent:**

This subclass is indented under subclass 538. Subject matter wherein the separation of the immune complex from the unbound component is aided by the addition of an agent which enhances the precipitation of the immune complex after the complex has been formed.

- (1) Note. Examples of precipitating agents used in the processes provided for here are charcoal, ammonium sulfate and carrier bound antigen or antibody.

**540 Double or second antibody:**

This subclass is indented under subclass 539. Subject matter in which unreacted antigen or antibody or the immune complex is separated by means of a second antibody or an immune complex containing the same.

- (1) Note. The second antibody is usually directed against the antibody of the complex (e.g., goat anti-rabbit immunoglobulin) but may be directed against the immune complex itself.

**541 Absorbent column, particles or resin strip:**

This subclass is indented under subclass 539. Subject matter wherein the separation is by a column of nonspecific absorbent, sorbent particles or by absorption of the complex or unbound phase by a resin in the form of a strip.

**542 Involving radioactive labeling:**

This subclass is indented under subclass 538. Subject matter which involves the detection of one of the separation phases by means of scintillation counting.

**543 INVOLVING PRODUCING OR TREATING ANTIGEN OR HAPTEN:**

This subclass is indented under the class definition. Subject matter involving the production or physical or chemical treatment of an antigen.

- (1) Note. A hapten is included in this subclass.

**SEE OR SEARCH CLASS:**

- 424, Drug, Bio-Affecting and Body Treating Compositions, for methods of using an antigen for treatment of the living body.  
530, Chemistry: Natural Resins or Derivatives; Peptides or Proteins; Lignins or Reaction Products Thereof, subclasses 402+ for methods of attaching hapten to immunogenic carriers.

**544 Producing labeled antigens:**

This subclass is indented under subclass 543. Subject matter which includes attaching a detectable label to antigens.

**545 Radioactive label:**

This subclass is indented under subclass 544. Subject matter wherein the detectable label is radioactive.

**546 Fluorescent label:**

This subclass is indented under subclass 544. Subject matter wherein the detectable label is one which fluoresces.

**547 INVOLVING PRODUCTION OR TREATMENT OF AN ANTIBODY:**

This subclass is indented under the class definition. Subject matter producing treating, separating or labeling of an antibody.

- (1) Note. Included in this subclass are:

(a)Processes including the injection of antigenic material into a body to produce antibodies for in vitro testing purposes.

(b)Processes of fragmenting or otherwise changing antibodies to improve assay specificity.

(c)Processes of associating the antibody with a detectable label.

**548 Monoclonal Antibody:**

This subclass is indented under subclass 547. Subject matter in which includes the production of antibodies by use of a cloned hybrid cell



line formed by fusion of myeloma cell with an antibody producing cell.

#### CROSS-REFERENCE ART COLLECTIONS

Art Collections 800 - 829 are related to antigen-antibody tests. Art collections 900 - 910 are related to chemical testing.

#### **800 FLUORESCENT DYES (E.G., RHODAMINE, ETC.):**

Art collection of fluorescent dyes useful in antigen-antibody tests.

#### **801 ELECTRON DENSE COMPOUNDS (E.G., FERRITIN, ETC.):**

Art collection of electron dense compounds useful as labels in antigen-antibody testing.

#### **802 PROTEIN-BACTERIOPHAGE CONJUGATES:**

Art collection of protein-bacteriophage conjugates used for labels in antigen-antibody tests.

#### **803 STABLE FREE RADICALS (E.G., SPIN IMMUNOASSAY, ETC.):**

Art collection of patents utilizing stable free radicals in an antigen-antibody test as a label.

#### **804 RADIOISOTOPE (E.G., RADIOIMMUNOASSAY, ETC.):**

Art collection of patents utilizing a radioactive label in an antigen-antibody test.

#### **805 OPTICAL PROPERTY:**

Art collection of patents related to the optical examination of the results of an antigen- antibody test.

#### **806 ELECTRICAL PROPERTY OR MAGNETIC PROPERTY:**

Art collection of patents related to the examination of the results of an antigen-antibody reaction by change in electrical or magnetic properties.

#### **807 APPARATUS INCLUDED IN PROCESS CLAIM (E.G., PHYSICAL SUPPORT STRUCTURES, ETC.):**

Art collection of patents related to apparatus used in antigen-antibody or binding protein testing.

#### **808 Automated or kit:**

Art collection under 807 in which the apparatus is self-operated or is a kit.

#### **809 Multifold plates or multicontainer arrays:**

Art collection under 807 in which the apparatus is generally planar and has a number of distinct test areas on its surface or consists of a series of containers held in a physical arrangement for testing.

#### **810 Tube, bottle, or dipstick:**

Art collection under 807 in which a tube, bottle, or dipstick carries the immunochemical.

#### **811 TEST FOR NAMED DISEASE, BODY CONDITION, OR ORGAN FUNCTION:**

Art collection related to antigen-antibody test for a named disease, condition of the body or organ function.

#### **812 Infectious mononucleosis:**

Art collection under 811 in which the named disease is infectious mononucleosis.

#### **813 Cancer:**

Art collection under 811 in which the named disease is cancer.

#### **814 Pregnancy:**

Art collection under 811 in which the body condition is pregnancy.

#### **815 Test for named compound or class of compounds:**

Art collection of patents relating to testing for an identified compound or class of compounds e.g., nitrates, etc.

#### **816 Alkaloids, amphetamines, and barbiturates:**

Art collection under 815 relating to an antigen antibody test for an alkaloid, amphetamine, or barbiturate.

#### **817 Steroids or hormones:**

Art collection under 815 relating to antigen antibody tests for steroids or a hormone.

#### **818 Human chorionic gonadotropin:**

Art collection under 817 relating to tests for HCG.

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| <p><b>819 MULTIFUNCTIONAL ANTIGEN OR ANTIBODY:</b><br/>Art collection relating to tests in which more than one compound or disease is identified or antigen or antibody is sensitized to a multiplicity of complements.</p> <p><b>820 HEPATITIS ASSOCIATED ANTIGENS AND ANTIBODIES:</b><br/>Art collection relating to tests for antigens and antibodies associated with hepatitis.</p> <p><b>821 INVOLVING COMPLEMENT FACTORS OR COMPLEMENT SYSTEMS:</b><br/>Art collection relating to identified complement factors or complement systems related to testing.</p> <p><b>822 IDENTIFIED HAPTEN:</b><br/>Art collection of patents relating to compound which are disclosed as haptens.</p> <p><b>823 IMMUNOGENIC CARRIER OR CARRIER, PER SE:</b><br/>Art collection of patents relating to the use of immunogenic carrier for haptens or to carriers, per se.</p> <p><b>824 IMMUNOLOGICAL SEPARATION TECHNIQUES:</b><br/>Art collection relating to the use of an antigen, antibody or binding protein reaction to effect a separation of a component from a mixture.</p> <p><b>825 PRETREATMENT FOR REMOVAL OF INTERFERING FACTORS FROM SAMPLE:</b><br/>Art collection relating to materials and methods for preparation of a sample for an immunological test by removal of interfering materials.</p> <p><b>826 ADDITIVES (E.G., BUFFERS, DILUENTS, PRESERVATIVES):</b><br/>Art collection relating to materials used as additives to solutions involved in antigen- antibody testing.</p> <p><b>827 LECTINS:</b><br/>Art collection relating to lectins and their use in immunological testing.</p> <p><b>828 PROTEIN A:</b><br/>Art collection relating to Protein A.</p> | <p><b>829 LIPOSOMES, (E.G., ENCAPSULATION, ETC.):</b><br/>Art collection relating to the formation of liposomes containing immunological materials.</p> <p><b>900 BREATH TESTING:</b><br/>Art collection of chemical tests relating to breath testing.</p> <p>(1) Note. Cross-reference art collections 900 - 910 are related to chemical testing.</p> <p><b>901 DRUGS OF ABUSE (E.G., NARCOTICS, AMPHETAMINES, ETC.):</b><br/>Art collection of chemical tests used for determining drugs of abuse.</p> <p><b>902 DOSIMETER:</b><br/>Art collection of chemical tests relating to the use of apparatus for determining the cumulative exposure to a given substance.</p> <p><b>903 DIAZO REACTIONS:</b><br/>Art collection of chemical tests relating to diazo reactions.</p> <p><b>904 OXIDATION-REDUCTION INDICATORS:</b><br/>Art collection of chemical tests and materials therefore which exhibit a color change caused by an oxidation or reduction reaction.</p> <p><b>905 PHOTOCHEMICAL ACTIVATION OF REACTIONS:</b><br/>Art collection of chemical tests which involve a step of photochemical activation.</p> <p><b>906 FERTILITY TESTS:</b><br/>Art collection of chemical tests relating to the detection or determination of capacity to reproduce.</p> <p><b>907 FETAL LUNG MATURITY:</b><br/>Art collection of chemical tests for the determination of the developmental state of the fetal lung.</p> <p><b>908 GRAVIMETRIC ANALYSIS:</b><br/>Art collection of chemical tests relating to gravimetric analysis of the results of chemical reactions.</p> |
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**909    NEPHELOMETRY:**

Art collection of chemical tests relating to measurements of the light scattering effect of solutions.

**910    IRON-BINDING CAPACITY OF BLOOD:**

Art collection of chemical tests relating to determination of the iron binding capacity of blood.

END